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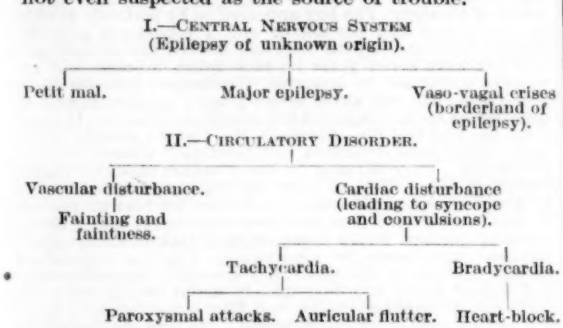
A DIFFICULTY often arises in the diagnosis of an attack of sudden loss of consciousness as to whether it was primarily cerebral, that is to say, of an epileptic nature, or primarily circulatory, that is to say, a faint or fainting attack. This difficulty is much enhanced by the fact that in all probability the doctor never sees the patient in an attack and has only the statements of onlookers to guide him. In the case of adults and older children the patient may be able to give such details of the onset and the recovery as will make the diagnosis clear. In the case of young children no such information is forthcoming, and all the doctor has to guide him is the mother's statement of what she saw or thought she saw. A physical examination of the patient may throw no light on the subject, because in many cases there are no evidences of cerebral disease or of any diseases or disorders in the circulatory system in the intervals between attacks. It is therefore of the greatest importance for a doctor to have as full a knowledge as possible of the various causes of fits and faints and of their accompanying features. The subject is a large one and only certain points can be touched on here.

Progress in our knowledge of heart disease and heart disorders has increased our means of diagnosing more accurately between fits and faints, both those which are seen and those which are unseen. It has enabled us to state definitely that certain forms of sudden attack, with loss of consciousness, which were formerly classed as being epileptic in nature are really due to cardiac disturbance. This will be fully illustrated later on. A comparison of the fits and faints under discussion brings out this interesting fact, that while in the case of primary cerebral disturbance there are attacks of minor and major epilepsy, so in the case of primary cardiac disturbance there are minor attacks characterised by fainting, and major attacks characterised by convulsive movements. Examples will be given later of older writers giving a diagnosis of petit mal when their description shows clearly it was cardiac disturbance they were dealing with. It will also be shown that in certain forms of cardiac disturbance cerebral symptoms may dominate the clinical picture so completely that the heart is not even suspected as the source of trouble.



Assuming for the moment that there are two varieties of fits and faints, a mild form of fainting with loss of consciousness, and a more severe one with convulsive movements superadded, we shall find that there are two primary sources of disturbance. These two sources are the central nervous system and the blood circulation, as shown in the accompanying chart.

EPILEPSY OF UNKNOWN ORIGIN.

The term "epilepsy of unknown origin" may provoke the criticism of those neurologists who can find a cause for every form of epilepsy, and will classify every type of convulsive seizure amongst "the epilepsies." Attacks of petit mal and of major epilepsy are still recognised by the bulk of the profession. My purpose is not to add to our knowledge of epilepsy but to direct attention to some attacks which simulate epilepsy and may be erroneously diagnosed as such. So far as my reading goes these difficulties do not seem to have presented themselves to neurologists—that is to say, there is little or no reference to them in their text-books. The mystery of epilepsy will be solved when we have a clear understanding of the pathogenesis of an attack of petit mal. It is in connexion with attacks diagnosed as petit mal and occurring during childhood that mistakes are most likely to arise. If it be definitely accepted that petit mal is not accompanied by any general circulatory disturbance, and that attacks simulating it in other respects are always accompanied by definite and distinctive circulatory disturbance, we have evidence that these attacks have a different origin from those due to epilepsy.

Sir William Gowers is very insistent on the fact that the colour of the face does not change during an attack of petit mal, although there may be slight pallor after it. Later on the face commonly becomes flushed. Both he and Sir Clifford Allbutt lay great stress on the fact that circulatory disturbance does not occur in epilepsy. The latter writes: [1]

> "I have never had my finger on the pulse of an epileptic at the earliest moment of an attack, but scores of times, as for instance in the wards of lunatic asylums, I have felt the pulse at the instant of the seizure becoming manifest; I have never, however, found any characteristic change in the rate."

An attack of petit mal presents as a rule a clear-cut picture, but in some cases, in addition to the sudden momentary unconsciousness, there may be other characteristics. Amongst these Gowers [2] mentions giddiness, falling down, jerks or starts of the limbs, trunk, or head, a sudden sense of fear, a sudden scream, and a sensation about the heart or the epigastrium. In those cases in which a sudden stab or other sensation is felt in the precordium or epigastrium the common diagnosis of a "fainting turn" will appear to have received additional confirmation. The other characteristics help to support a diagnosis of petit mal and to exclude that of a simple fainting attack.

FAINTNESS AND FAINTING.

A fainting or syncopal attack is usually ascribed to cardiac weakness, but this is hardly correct. A strong man may faint at the sight of blood or when being vaccinated. Fainting is much more common amongst people with sound hearts than amongst patients with diseased ones. Fainting is quite common in children between the ages of 8 and 15 years, but rare at those ages in the subjects of heart disease.

The underlying conditions in those who are subject to ordinary fainting turns would appear to be an unstable and weak vasomotor system. The normal response to some nervous shock or unusual sensation does not occur in the vasomotor system, and blood accumulates in the abdomen and dependent parts. The result is cerebral anæmia and loss of consciousness. The condition is usually short-lived, without further complications, and recovery rapidly follows the recumbent posture. The patient may fall suddenly, but as a rule has sufficient warning of the oncoming seizure in the shape of a feeling of faintness to allow of his sitting down or holding on to some support. The pulse may be small and weak during a faint, but the rate is not markedly affected. The contractions of the heart are temporarily weakened, but this is probably due more to the small quantity of blood entering the heart than to loss of contractile power. The important factor in all such fainting or syncopal attacks is the condition of cerebral anæmia, and

when this has reached a certain stage loss of consciousness follows.

The term cerebral anæmia is a convenient one but it lacks precision. In all probability a syncopal attack is not due so much to the small amount of blood which reaches the brain as to the sudden fall in blood pressure which takes place in the cerebral arteries. As Gowers [3] has pointed out, consciousness is a function of the brain cells, and loss of consciousness, as in an ordinary fainting attack, cannot be due to a temporary absence of blood cells, for it is lymph and not blood which comes in contact with nerve cells. At the onset of unconsciousness the supply of lymph is sufficient for the metabolic processes required by functioning nerve cells. He emphasises the different causes at work in the loss of consciousness in epilepsy and in fainting. "We have to conceive the loss of consciousness as occurring spontaneously in epilepsy, and as due to a sudden diminution in the intracranial pressure in syncope acting as a mechanical influence." When I use the term cerebral anæmia in connexion with attacks of syncope due to circulatory disturbance, the above remarks on the accompanying fall in blood pressure should be kept in mind.

Although there is such a thing as a fainting habit, possibly less common now than formerly, a faint is usually an isolated occurrence. If a mother states that a child has "fainted" five times in a day or a week we naturally think rather of petit mal. It is common to find a definite cause for a fainting turn, such as a hot stuffy atmosphere, an attitude requiring prolonged strain, a sudden fright or other nervous shock, or severe pain. No such definite preceding cause is usually present in connexion with attacks of petit mal. There is a certain fainting type of person, with the poor vasomotor tone already referred to, who is subject to chilblains in winter and blue cold hands in summer, who turns pale or flushes upon slight provocation, who often shows postural albuminuria, and whose staying power on exertion is slight. The accompanying conditions of these fainting turns are such that a correct diagnosis can usually be made if all the circumstances are carefully inquired into, and if the sufferer is old enough to describe his sensations intelligently.

CARDIAC DISTURBANCE IN THE GENETIC SYSTEM.

For clinical purposes it is useful to divide the heart into two parts, the contracting muscle and the genetic system. The driving power of the heart lies in the contracting muscle, but the control of this function lies in the genetic system, which determines the rate and rhythm and regularity of the heart beat. The genetic system is the name given by Sir James Mackenzie to that specialised tissue in the heart which commences at the sino-auricular node and extends through the auricles, the auriculo-ventricular node, and the auriculo-ventricular bundle to the ultimate branches of this bundle in the muscle-fibres of the ventricles. He prefers the term genetic system to conducting tissues, as in this system is the starting-point of the heart beat and it does more than conduct impulses; its activity means an impulse transmitted from cell to cell, each cell discharging its energy in the process. The fits and faints we are now going to consider are due to disturbance of the normal working of the genetic system.

These disturbances in the genetic system are of two kinds: first, a condition of tachycardia or abnormally rapid action of the heart; and, secondly, bradycardia or abnormally slow action of the heart. In each of these conditions there occur faints which may be diagnosed as petit mal, and convulsive seizures which may be diagnosed as major epilepsy. In each of these conditions the syncopal attacks are due to the usual cause—namely, cerebral anæmia of a temporary character. The heart fails to supply a sufficient amount and pressure of blood to the brain. If this cerebral anæmia is sufficiently prolonged a convulsive seizure ensues.

PAROXYSMAL TACHYCARDIA.

This is a clinical term signifying a sudden increase in the rate of the heart from normal to 160–200 beats per minute, lasting for some seconds, or minutes (or hours), and followed by a sudden cessation of the tachycardia, with or without some irregular action at the close. The patient is usually conscious of the new cardiac rhythm, feels a fluttering sensation on the chest, is conscious of the heart racing, and may have a feeling of exhaustion and prostration during an attack and afterwards. Many such attacks occur in patients who present no other signs or symptoms of heart disease, who suffer little inconvenience during an attack, and who in my experience have grown up to perfectly healthy adult life. But there are other cases in which the onset of the tachycardia is attended by syncope and falling down, and other characteristics which may lead to a diagnosis of petit mal. Examination of the patient during an attack reveals the condition of pathological tachycardia—that is to say, a heart-rate above 160 per minute. It will be found that when the attack ceases and the symptoms pass off the heart-rate has returned to normal. After watching a series of these attacks one is forced to the conclusion that the tachycardia is the cause of the seizure, and that in all probability the small amount of blood discharged by the heart has produced the syncopal attack. If the patient is not seen in an attack the doctor may easily be puzzled and an erroneous diagnosis may easily be made. Here are two cases in which I blundered as the result of my ignorance of this condition.

CASE 1.—A female child at the age of 2¼ years began to suffer from screaming fits at night. In an attack she was said to become stiff and turn grey in colour. She was admitted to hospital at the age of 3¼ years with a provisional diagnosis of petit mal. There was no evidence of any organic disease and the child was healthy in appearance. Attacks occurred in the hospital at irregular intervals, sometimes by day, sometimes at night. Here is a description of a typical attack. The child was sitting in a chair when she commenced crying, rested her head on the side of the chair, and then suddenly collapsed on the floor. She was unconscious, the face was pale, the lips rather blue, and the pulse-rate was 180 per minute. She recovered consciousness within a minute of falling but was rather dazed at first. Two minutes later the pulse-rate was found to be 70, and then it gradually rose to between 80 and 90. In some of the attacks her limbs became rigid and her teeth were clenched. In all of the attacks a condition of tachycardia was present, of a purely temporary character, but the rate, the sudden onset, and the sudden offset showed that a new rhythm was present in the heart during the attacks.

CASE 2.—A boy of 4 years began to suffer from "fainting fits" and had five attacks in the course of the following 12 months. An attack began with the boy's screaming loudly and falling down. After a few minutes he went off to sleep and then woke up quite cheerful. He had nose bleeding as the result of one fall and a bump on his forehead as the result of another. The boy appeared to be perfectly healthy in every way and his doctor and I considered that the attacks were due to petit mal, and treated him accordingly. For the next seven years he took much bromide but the attacks continued at intervals, the longest interval being two years. He was never seen by us in an attack, and no question as to the diagnosis was raised until he was 11 years old. He had had five attacks in the first six months of the year, which were described as "fainting" attacks without screaming. They followed on some sudden shock or during active exercise. He had been playing games at school but in a quiet way, with some one to run for him at cricket. It was then found that any active exercise, like walking upstairs quickly, would bring on an attack of tachycardia, the heart-rate being 180 per minute. The boy complained of the beating of the heart, felt generally uncomfortable, and looked dazed and anxious. In about two minutes the tachycardia ceased abruptly, and after some irregular beats the normal rate of 60 was resumed. He was old enough to describe his own sensations in connexion with the fainting attacks. "When I faint my heart thumps and gallops and then it seems to try and stop, and then I seem to lose my bearings."

It may be suggested that in these two cases there was a double condition of petit mal and attacks of cardiac syncope. Observation of the patients has

led me to the conclusion that there was no petit mal, and that the attacks were all of the same character and due to the cardiac disturbance. In the case of the girl all of the attacks were of the same nature, and in all of them which were observed the heart-rate was abnormally rapid. The sudden onset and the sudden cessation of this tachycardia coincided with the period of an attack. Exertion seemed to induce an attack at times and it seemed to bring on some symptoms of an attack, which led the child to take less and less exercise. With cessation of exercise, from progressive heart failure, the attacks ceased entirely. In the case of the boy he has been under treatment for seven years for petit mal, and in all probability his attacks were really cardiac in origin, and not epileptic in character. From the onset the attacks have followed usually on exertion, and as the years passed they came to be definitely associated with exertion or nervous shock. The boy came to learn this fact for himself and would not over-exert himself because he knew it would make him faint. This is very unlike a condition of petit mal. The first suggestion of any heart trouble was at the age of 11 years. Writing in 1926, his mother says :—

"In August, 1925, he was much worse than he is now, by that I mean he then had to walk very slowly, and if he went upstairs his heart would beat at an alarming rate, or even to laugh much would make him feel bad."

At the present time one can bring on an attack of tachycardia by making the boy run, but he is very conscious of the cardiac discomfort thus induced and will not push his exertions beyond a certain point. Comparing his present attacks with those described at the age of 4 years and onwards, one cannot find that there is any essential difference.

Turning from my own experience of this type of case to that of others I find the following in an article on cardiovascular disease in Garrod's "Diseases of Children."[4] The section is on disturbances of cardiac rhythm and the paragraph is headed Tachycardia and Epilepsy :—

"There are some cases in which paroxysms of extreme rapidity of the heart's action occur in children who have previously suffered from epilepsy. Two such cases have come under the writer's notice. The first, a boy of 9 years, had been subject to epileptic fits up to the age of 4 years, and from infancy had attacks of what the mother termed palpitation of the heart. Although the epileptic fits had ceased, about every three weeks violent attacks of palpitation occurred without apparent cause and always at night. Between the attacks the rate was about 80 per minute and the action slightly irregular. The second, aged 1 year and 5 months, four days after a fit, had some palpitation of the heart lasting several days, and since then had been subject to attacks about once a week. These always commenced in the morning and lasted for some hours. The heart was apparently sound. Both these cases improved slowly under treatment with bromides."

In the light of my own cases I venture to suggest that there was no epilepsy here but merely the results of paroxysmal tachycardia.

Hirschfelder,[5] in a chapter on paroxysmal tachycardia, lays stress on the fall of arterial pressure which induces cerebral anæmia, and is accompanied by weakness, vertigo, and even syncope. In one patient the syncopal attacks had led some physicians to diagnose heart-block with the Stokes-Adams's syndrome, but further observation showed that the cerebral anæmia resulted not from bradycardia, but from paroxysmal tachycardia. Esmein and Dougelot,[6] in an article on the syncopal form of paroxysmal tachycardia, describe this as being usually less severe than that of the Stokes-Adams's type. Dr. Arlie Barnes [7] found that—

"cerebral manifestations, consisting of hemianopsia, temporary blindness, fainting, falling with or without loss of consciousness, and epileptiform seizures occurred in 15 of 104 cases of paroxysmal tachycardia that were studied."

These experiences of the symptoms associated with paroxysmal tachycardia must be kept in mind if one is not to be placed in the position thus described by the late Dr. George Balfour [8]:—

"Nothing can make a man feel more helpless than to be brought for the first time face to face with a bad attack of tachycardia, of the nature of which he knows nothing, and, perhaps, may never even have heard of its existence."

AURICULAR FLUTTER.

A study of auricular flutter throws further light on the occurrence of syncopal attacks associated with tachycardia. An attack of auricular flutter can be distinguished in many cases from one of paroxysmal tachycardia only by means of an electrocardiographic record. It is characterised by a very rapid ventricular rate, reaching sometimes from 200 to 220 beats per minute or even, according to some, 300. As a result the ventricular contractions at the onset may be so weak that the patient loses consciousness. An attack of auricular flutter may be sudden, brief, without any previous symptoms of ill-health, and without any subsequent change in the heart. If the attack is brief, and the patient has a syncopal attack it is very probable that a diagnosis of petit mal will be made. Attacks of auricular flutter occur but rarely in infancy and childhood, they may develop in early adult life, but they are much more common in later life—the period of degenerative heart disease. Syncopal attacks are quite common and are clearly due to cerebral anæmia, the weakened contractions of the left ventricle failing to maintain a sufficient supply of blood to the brain. Sir James Mackenzie [9] records a number of cases in which the patient suddenly lost consciousness and fell down. He says that some have attacks of unconsciousness lasting from a few seconds to hours, and that falling to the ground is not uncommon. In his monograph on "Auricular Flutter," Dr. W. T. Ritchie [10] says that the initial symptom of each paroxysm is palpitation, which is often very distressing. In some instances vertigo ensues as a result of the weak and extremely rapid ventricular action, and there may be occasional syncopal attacks. He has noted that a paroxysmal attack of flutter may be excited suddenly and without any warning, under the influence of emotion or physical exertion. It would appear from these observations that the cerebral symptoms of an attack of auricular flutter may be identical with those described in connexion with paroxysmal tachycardia.

BRADYCARDIA AND HEART-BLOCK.

The type of bradycardia which is associated with heart-block is due to an interruption of the normal progress of the heart beat through the genetic system. Under certain conditions of heart-block the patient is liable to fainting attacks with loss of consciousness, and sometimes falls suddenly. In many cases of heart-block there may be a slow but regular action of the ventricle, in which no symptoms of the nature we are dealing with will arise. In other cases there is a prolonged ventricular pause leading to cerebral anæmia and loss of consciousness. The attack may be brief and sudden and the patient, if talking at the time, may simply cease and then resume where he left off. This form of attack is very easily mistaken for petit mal. In other cases there is loss of consciousness and the patient falls to the ground. In more severe cases there is some twitching of the muscles of the face, and this epileptoid seizure may develop into a general convulsion—the well-known Stokes-Adams's syndrome. These various results present in cerebral anæmia have been accurately measured by Sir James Mackenzie [11] in terms of the length of the ventricular standstill.

"When the ventricle stands still over 10 seconds cerebral symptoms dominate the picture. First there is giddiness, then loss of consciousness, and if the standstill exceeds 15 seconds, twitching of muscles as those of the face, the neck, and arm follow. If the standstill of the ventricle extends over 20 seconds violent convulsions and stertorous breathing are set up. As soon as the ventricle begins to beat all these phenomena disappear, the patient quickly recovering consciousness."

He recognises the possibility of mistaking the nature of these attacks when the doctor has only the patient's own experience to guide him.

"When a patient states that he loses consciousness for a brief moment—a few seconds—and immediately recovers, sometimes falling down, it may be surmised that his attack is due either to a temporary heart-block or petit mal. If the patient is young the latter may be suspected; if in later life—over 40—the former."

It is interesting to read the experiences of former clinicians who recognised the phenomena present in heart-block, although they were ignorant of the nature of this condition. Stokes and Adams recognised the epileptoid attacks associated with a slow pulse. Hilton Fagge [12] (1888), in the chapter on minor epilepsy or petit mal, gave the following account of an attack which was evidently due to heart-block:—

"Some years ago while I was one day listening with the stethoscope to the heart of a man whom I have never seen before, its beats suddenly ceased. I looked up and saw that his face had turned deadly pale. He said that he was going to faint and reclined back on the chair from which he had risen. I could feel no pulse at his wrist and for an instant I thought he might be going to die, but I had hardly time to ring my bell when the colour returned to his face and I found that his heart was beating again. Presently there was a little twitching of the muscles in one or both hands. In a minute or two he was able to tell me that he often had 'fainting fits' and that some years back he had been subject to epileptic seizures. It appeared clear that the attack which I had witnessed was one of minor epilepsy."

It appears equally clear now that this was an attack of heart-block, and in all probability the previous "epileptic seizures" were of the same nature.

Sir William Broadbent [13] (1897) wrote as follows on the symptoms of fatty degeneration of the heart:—

"The epileptiform attacks are not often violent but resemble petit mal rather than a typical epileptic fit; while, however, the convulsion may not be so severe there is profound unconsciousness—not like epileptic coma, but of a syncopal character—and the pulse may be extremely infrequent, sometimes less than 20 in the minute. In my judgment the heart failure manifested by the slow pulse and the consequent arrest of the cerebral circulation are the cause of the fits, and it is not the epileptiform attack that affects the action of the heart. By the time any of these forms of attack occur the diagnosis of fatty heart is usually sufficiently clear; but I have had under observation a case of very slow pulse with petit mal in which the strength and volume of the pulse and the degree of impulse of which the heart was capable precluded the idea of advanced degeneration."

The clinical observations of this physician—who was a great cardiologist and no mean neurologist—show clearly that he was dealing with attacks of heart-block with standstill of the ventricles and not with a condition of "fatty heart" or of petit mal.

Although, as Mackenzie states, heart-block with syncopal or convulsive attacks is much more common after the age of 40, the possibility of its occurrence in early life must be kept in mind. A good number of cases of congenital heart-block are now on record due to some defect in the interventricular septum. Those patients are liable at times to attacks of giddiness and fainting. In acute infective fevers, such as diphtheria, heart-block may develop, but any symptoms in these cases are not likely to be mistaken for those of petit mal as the patient is under close observation. It is not so well known that heart-block accompanied by faints and fits may be an early sign of rheumatic infection. I have recorded elsewhere [14] the following case:—

A schoolboy of 17 years was noticed by a brother at 3 A.M. to have a fit. The patient had just returned to bed after having risen to take a drink of water. From 3 A.M. to 5 A.M. he had a series of fainting turns, and at 5 A.M. another fit. The doctor who attended the case found that numerous fainting turns occurred in which the patient turned pale but did not lose consciousness; he complained of feeling faint. In the more severe attacks or "fits" he became pale, the legs and arms were fixed, and he lost consciousness; some twitching of the limbs and face occurred, he breathed deeply, the face became flushed, and he recovered consciousness. The severe attacks occurred only occasionally until midday and then became more frequent. After a severe attack there was usually vomiting or violent retching.

When I saw him at 2 P.M. the same day the boy was feeling tired and exhausted. The pulse was at times steady and regular at 80 per minute, and at other times irregular with pauses of varying length. These pauses were characterised by a feeling of faintness on the part of the patient. During 20 minutes the pulse on two occasions was quite imperceptible and the ventricles ceased to beat for long intervals and each time a "fit" as described above occurred. The periods of ventricular standstill were so prolonged that one wondered if the ventricle would ever resume beating.

By observation of the heart and pulse during the faints and fits one was able to recognise that the condition was circulatory in origin and not epileptic. Taking the attacks by themselves one could easily have adopted a diagnosis of epilepsy. The underlying condition was apparently a toxic disturbance of the genetic system, due to acute rheumatic infection, and leading to heart-block of an intermittent character, and, as it proved, of a temporary nature.

SOME FURTHER PROBLEMS.

While in the case of bradycardia due to heart-block the attacks of syncope and convulsive movements can be understood easily as the result of cerebral anæmia from cessation of ventricular action, the exact conditions in connexion with paroxysmal tachycardia and auricular flutter are not so clear. There is here no cessation of the circulation. The heart continues to beat and, as a rule, regularly. The syncopal attack usually occurs at the onset of the new rhythm. Many patients have similar attacks of tachycardia and yet never show any signs of fainting. What special factor is it which determines a fainting attack in one patient and not in another, or in one attack and not in another? It may be suggested that there is more disturbance of the blood flow through the cavities of the heart at the onset of the new rhythm, and that this leads to a diminished supply of blood to the cerebrum. Later the heart accommodates itself to the changed condition and more blood reaches the brain. In many of these cases of tachycardia the auricles and ventricles are contracting at the same time—as graphic records show—and the refilling of the cardiac chambers during diastole must be a very partial process. It may be that want of blood in the heart is the direct cause of want of blood in the brain. In the case of auricular flutter Sir James Mackenzie considered that the weakness or absence of the pulse was due to the ventricle responding for a brief period to each auricular contraction. It is clear that a heart beating at the rate of 200 to 250 per minute has very little driving power, as well as very little blood to expel. A fainting attack under such conditions is easily understood, but experience has shown that similar attacks may occur when the heart-rate is not more than 180 per minute. These problems require further study, and possibly closer observation of the circulatory conditions present at the onset of an attack may help their elucidation.

REFERENCES.

1. System of Medicine (Allbutt and Rolleston), v., 834.
2. Epilepsy, chap. iv., p. 129.
3. The Borderland of Epilepsy, p. 2.
4. Edited by Garrod, Batten, and Thursfield, p. 492.
5. Diseases of the Heart, 1918, p. 124.
6. La Presse Médicale, 1914, i., 489.
7. Collected Papers of the Mayo Clinic, 1925, xvii.
8. Lectures on Diseases of the Heart, 1898, p. 288.
9. Diseases of the Heart, 1925, p. 216.
10. Auricular Flutter, 1914, p. 83.
11. Diseases of the Heart, p. 249.
12. Principles and Practice of Medicine, i., 793.
13. Heart Diseases, 1897, p. 288.
14. Arch. of Disease in Childhood, February, 1926.

Some Aspects OF INFLAMMATION AND INFECTION.*

A Course of Four Lectures delivered for the University of London at Guy's Hospital on May 20th, 27th, 31st, and June 3rd, 1927,

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LECTURES III. AND IV.*

IN the previous lectures we have discussed the different types of lesions which result from the damage of the tissues by various agents. We have now to consider whether these observations are of merely academic interest or whether they have any practical bearing in helping us so to understand the inflammatory process that by the intelligent utilisation of our knowledge we can control it. This is really what we have in view because, for practical purposes, inflammation and infection are, in the microbic diseases, synonymous terms. The medical officer of health is perfectly justified in calling milk infected if it contains virulent bacteria; no one but a hyperpurist would object to his use of the word. Again, a bacteriologist may properly describe a patient in whose throat virulent diphtheria bacilli are growing as infected, though he may exhibit no signs of illness. But for the pathologist infection implies something more. It implies the establishment and growth within the tissues of a micro-organism. The mere presence of an organism is not sufficient to warrant the use of the word; there must also be definite changes in the tissues. In other words, pathologically speaking, infection cannot exist without inflammation.

The following experiment, which was suggested to me by Dr. W. E. Gye, will make this point clear. (Fig. 1.)

Twelve mice were inoculated into the right flank with washed and heated spores of *Vibrion septique*. Six other mice were inoculated into the right flank with the same suspension of spores but with the addition of 5 mg. of calcium chloride. The following day these six mice were dead with typical gas gangrene, but the first 12 remained perfectly healthy. Two days after inoculation one of them developed gas gangrene, but the other 11 were unaffected. Four days after the original inoculation six of these 11 mice were inoculated into the right flank with 10 mg. of calcium chloride; they died of gas gangrene within 36 hours, but the remaining five are still alive and healthy. In other words, the mere presence of the organisms was not sufficient to determine pathological infection; they remained latent in the tissues until defence-rupture was brought about.

THE SPECIFICITY OF INFLAMMATORY LESIONS.

It becomes of the first importance, therefore, to decide whether the different inflammatory processes which have been considered are really specific and invariable or, at any rate, sufficiently so to give a working basis to an attempt to combat infection. Does the typhoid bacillus, for example, always produce the same reaction in the human body, and is this reaction so characteristic that we can with certainty distinguish it from the reactions brought about by other pathogenic microbes? In many modern textbooks the specificity of infections is definitely taught, and in the older literature we find much attention devoted to the various tissue changes which follow infection with different organisms. But in practice the tendency nowadays seems to be to disregard this point of view altogether, and to wage a standardised, and quite illogical, warfare against all types of microbes. Indeed, Powell White has recently expressed the view that the inflammatory process is not specific, but that any variations in reactions are due to the intensity of the irritant. Even with our present imperfect knowledge this attitude is untenable, and we may reasonably hope that a closer analysis of infections will reveal further distinctions which have so far escaped us.

It must always be remembered that the clear-cut observations of the chemist and physicist are scarcely within the reach of the biologist. Individual animals vary enormously in their behaviour under experimental conditions, and local differences in the structure of the tissues in animals of different species make for further complications. The mouse, for example, with its loose attachment of the skin to the body wall, permits of a localisation and concentration of an inoculum which can scarcely be obtained in the rabbit. And in the dense collaginous cutaneous and subcutaneous tissues of the rabbit the reaction to an irritant is very different from that occurring in the delicate tissues of the mouse.

If, bearing these limitations in mind, we examine certain of the inflammatory processes, we find that

FIG. 1.

Vibrion septique. All inoculations into right flank.

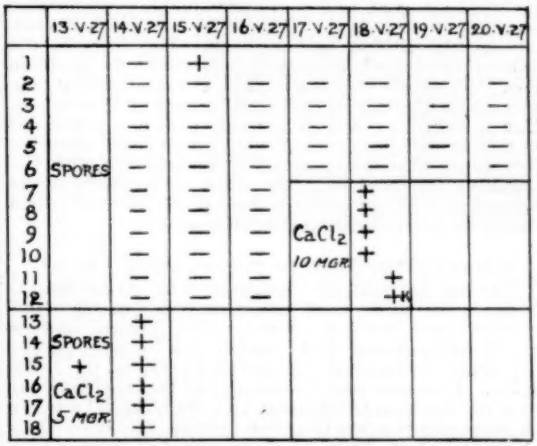


Chart of an experiment illustrating the determination of *Vibrion septique* infection in the mouse by calcium chloride.

in those due to chemical or physical agents a high degree of specificity obtains. Calcium and silica inoculated into the subcutaneous tissues of the mouse bring about a sequence of changes which are definite and regular; the reactions vary in intensity according to the doses administered, but in essential features they are always the same. Turpentine, again, produces in the subcutaneous tissues of the rabbit a lesion which can scarcely be mistaken for anything else. Similarly, more inert substances such as carbon, aluminium oxide, cholesterin, and simple foreign bodies, also give rise to characteristic lesions. I mention only those reactions with which I am especially familiar, but I see no reason to doubt the possibility of recognising a whole range of specific non-bacterial inflammations. No doubt many substances may call forth practically identical changes—there may, in fact, be a series of "group reactions"—but we may reasonably claim that in the normal animal a constant irritant will produce a constant inflammatory reaction.

Turning now to the second group of inflammations, those due to bacteria, we find they are much less constant. Whereas in the chemical and physical reactions the exciting agent can be measured and controlled, and the tissues react as regularly as any living substance can be expected to do, in this group the exciting agent and the host are subject to such biological variations that only by the study of a vast mass of material is it possible to reduce any particular infection to its fundamental characteristics. An organism of normal virulence will produce

* Lectures I. and II. appeared in THE LANCET last week. All the lesions described were illustrated by lantern slides.

in an individual of average susceptibility a fairly regular reaction, but any variations in virulence or susceptibility may so modify the inflammatory process as to cause the greatest confusion. The histology of tuberculosis, for example, belongs to the elements of pathology, but under certain circumstances the tubercle bacillus causes lesions which may deceive the most experienced histologist. Nevertheless, enough facts have already accumulated to encourage the pursuit of this line of investigation. Indeed, the very fact that variations in infections are so common should be a further encouragement rather than the reverse, for very often the true understanding of the usual is best obtained from a study of the unusual. A very large amount of work has already been done in the direction of modifying the infectious process, but the literature of the subject is so vast that no attempt at any kind of review can be made here.

EXPERIMENTAL METHODS OF ALTERING THE HOST'S REACTION.

Altering the virulence of the infecting organism amounts to increasing or diminishing the dose of the exciting agent, and is a most valuable experimental method employed by Pasteur in his pioneer work on chicken cholera and anthrax. But it is in the behaviour of the host that the answer to the problem lies. Two obvious methods of investigating the behaviour of the host in infection suggest themselves. One is to break down the immunity to any particular organism of a non-susceptible animal, and then to determine what happens when we infect it with the organism in question; the other is to study what happens when we infect a susceptible animal which has been rendered artificially immune.

IMMUNITY NOT LIMITED TO THE BODY FLUIDS.

Having successfully prepared our experimental animals we must next ask ourselves exactly what it is we are going to study. The natural answer would be the blood of the animal, for by most people the study of immunity is limited to that of the body fluids. I do not wish to enter into the ancient controversy between the cellular and the humoral schools of immunity; a working compromise seems to have been arrived at between them and the humoralists have absorbed the wandering phagocyte into their fold. But we are entitled to ask whether the blood contains and represents the whole of the defensive mechanism of the individual. Is it only a vehicle of inconstant composition, or does it really represent the concentrated essence of the tissues; and can we comprehend the whole process of infection from a study of the blood alone? Except in the rarest instances infection of the blood stream is a purely laboratory phenomenon. Infection concerns the tissues first and the blood only secondarily, and it may be that the importance of the blood in immunity has been overrated. We are all familiar with the serological phenomena of immunity. Immunisation is undoubtedly accompanied by the appearance of various antibodies in the body fluids; but are these serological changes really a measure of immunity or are they merely a concomitant of it? Further, does the antibody content of the blood serum represent with exactitude the antibody content of the tissue lymph? And does this, in turn, vary in composition according to the powers of resistance possessed by the cell itself?

Modern immunology rests on the tacit assumption that the antibodies of the blood do, in fact, serve as a qualitative and quantitative measure of the state of immunity of the body as a whole. If one considers this assumption critically, it is difficult either to prove or disprove it. The process of infection is concerned with so many variables that even the most carefully devised experiments are more than likely to give ambiguous results. And the whole trend of work in this subject has for so long been concentrated on the antibodies of the blood that it seems almost presumptuous to doubt their importance. Nevertheless, the tissue cell must be the ultimate source of the protective constituents of the serum.

In the immunity produced to toxins we know that the specific antitoxin circulates in the blood and that the immune blood can confer passive immunity if injected into another individual. But this is not the whole story. Römer showed many years ago that a local immunity to abrin could be developed in the rabbit's conjunctiva without any concomitant development of antitoxin in the serum or in other tissues. Again, in the phenomenon of anaphylaxis it has been clearly demonstrated that the site of the reaction

FIG. 2.

Section of vegetation on the heart valve in a case of subacute infective endocarditis showing black masses of streptococci.

is in the cells of the body. Now, just as it is possible to produce passive immunity to toxins, so it is possible to produce passive anaphylaxis, but the animal receiving the sensitised serum only becomes hypersensitive after a certain interval of time. The mere drenching of the tissues with a sensitised serum is not sufficient to render an animal anaphylactic; there must be time for the serum to bring about a definite change in the tissue cells.

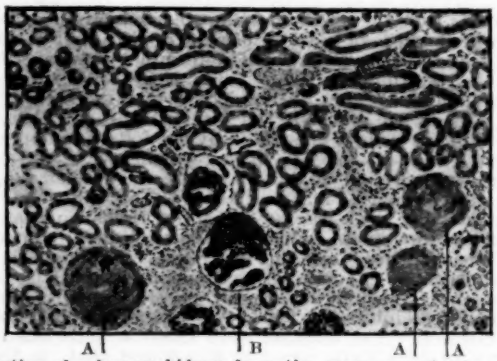
One of the most useful diagnostic methods given to us by immunology is the Wassermann reaction. This, as you know, is a logical extension of the Bordet-Gengou phenomenon. It was not arrived at by chance but was based on the reasoned application of immunological facts. How disappointing is it, therefore, to find that there is really no rational basis for the Wassermann reaction at all. It is, indeed, as empirical as any procedure of clinical medicine, and I think one may be permitted a doubt as to the validity of the immunological teaching on which it rested.

Another immunological test which has certain anomalous features is the opsonic index. This was chiefly established by observations on the serum of patients suffering from tuberculosis and staphylococcal infections. The method depends, of course, on the estimation of the phagocytosis by polynuclear leucocytes of organisms which have been exposed to serum. Now the polynuclear leucocyte plays a predominant part in staphylococcal infections, but it appears to have no importance at all in the ordinary tuberculous lesion. Are we justified in using as our indicator of immunity a cell which plays no part in the progress of the disease in the body? Can the same indicator be of equal value in two such diverse infections? One does not doubt the accuracy of the opsonic index any more than one doubts the accuracy of the Wassermann reaction, but it is permissible to question the validity of the assumption on which it rests.

But apart from theoretical considerations we must all be aware of direct observations which are incompatible with the view that immunity is concerned entirely with the circulating blood. A patient severely ill with typhoid fever may have a high agglutinin content of his blood serum, while, on the other hand, it is said that individuals who have acquired active immunity against such diseases as enteric fever, plague, and cholera remain relatively resistant long after demonstrable antibodies have disappeared from the blood. H. D. Wright has recently published some extremely interesting observations bearing on this. He shows that in immunised rabbits pneumococci rapidly and permanently disappear from the blood stream, but that the serum shows no constant increase of the usual antibodies. And many cases of subacute infective endocarditis exhibit a phenomenon which is not sufficiently appreciated. (Figs. 2, 3, and 4.) In these cases colossal numbers of organisms grow on the endocardium, actually in the blood stream, but should they become detached and carried to other parts of the body they seem unable to proliferate. This is especially well seen in the kidneys when emboli of microbes are caught up in the glomeruli, for progressive lesions scarcely ever develop; the organisms which proliferate freely when bathed by the blood stream are killed off by the tissue cells, and healing takes place with the minimal amount of scarring.

I do not think, therefore, that we shall achieve our end if we limit our study to the blood. But at the same time I do not suggest for one moment that antibodies are of no importance. The serological changes of immunity are obviously part of the profound alteration in the body as a whole which follows infection; there can be no two opinions about that; the only question that arises is how big a part do they play? For me, at least, this question is still unanswered, and is likely to remain unanswered until

FIG. 3.



Section of a human kidney from the same case of subacute infective endocarditis shown in Fig. 2. The section shows completely fibrosed glomeruli (A) and one partly fibrosed (B). There is some interstitial scarring.

it is more generally recognised that the chemist and physicist have in immunology a fruitful field for their labours.

TISSUE REACTIONS AS A FACTOR IN IMMUNITY.

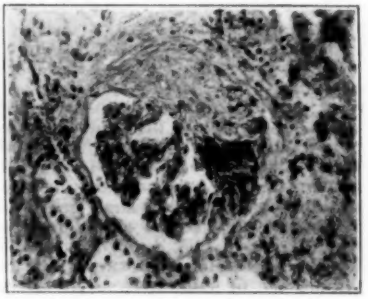
If, on the other hand, we devote ourselves to the study of tissue reactions, what guarantee is there that we shall meet with success? There is very little, I am afraid, to encourage us, for comparatively little work has been done in this direction. The work of Metchnikoff and his school has established the importance of the phagocyte, but this is scarcely the same thing. Koch, some 40 years ago, demonstrated that the tissues of the tuberculous guinea-pig react in a remarkable way to a second infection with tubercle bacilli, and more recently continental pathologists have devoted much attention to the analysis of primary and secondary tuberculosis in man. From this work it appears to be established that the almost universal primary tuberculosis of infancy or childhood is successfully overcome in the majority of people and that the characteristic lesions heal with a specific tissue reaction. But this infection permanently modifies the tissues of the host, and should a second infection occur in later life, it is definitely different from the primary one, both in the distribution and progress of the lesions and in their histology.

But experimental work in this direction has been relatively neglected, and I propose, therefore, to devote the rest of the time at my disposal to discussing the possibilities of this method of research.

THE MECHANISM OF DEFENCE-RUPTURE.

As I have already said, we may enlarge the scope of our investigations by using animals which have been artificially rendered more immune, or more susceptible, to any particular organism. The latter method is the simpler, and it is the one with which I have chiefly worked. We owe our knowledge of its possibilities to the investigations into the pathology of gas gangrene carried out by Bullock and Cramer in 1918. These authors found, as others have done before them, that surface cultures, or washed broth cultures, of *B. welchii* are practically non-pathogenic to mice and guinea-pigs, though small quantities of whole broth culture produce a fatal gas gangrene in 24 hours. They came to the conclusion that these animals are naturally immune to *B. welchii*, and that if gas gangrene is to be produced there must be present, in addition to the host and the organism, a third or accessory factor. Clinical experience confirmed this impression, for while many wounds on the western front were infected with *B. welchii*, or harboured these bacilli, only a small percentage developed gas gangrene. On further investigation it was found that various substances, among them being the ionisable calcium salts, are capable of determining infection if injected into animals along with the detoxicated organisms. The conclusion reached from an exhaustive series of experiments was that the calcium produces a local change in the tissues, and the effect of this change is to bring about a local breaking down of the defensive mechanism against *B. welchii*. To the whole phenomenon they gave the name "defence-rupture." I have merely sketched out the general trend of this work; Gye and Cramer extended it in various directions, and their observations appear to me to open up a very important field of investigation. If this work means anything at all, it is that in infection the state of the tissues is of the first importance. Normally we are able to cope with such pathogenic organisms as we happen to encounter, but from time to time our defensive mechanism fails, and infection takes place. There is evidence that this rupture may be due to some recognisable injury of the tissues, but more often, I imagine, it is due to some more subtle change.

FIG. 4.



High power view of a glomerulus from the kidney illustrated in Fig. 3 showing scarring following a streptococcal embolus.

Streptococcus and Calcium.

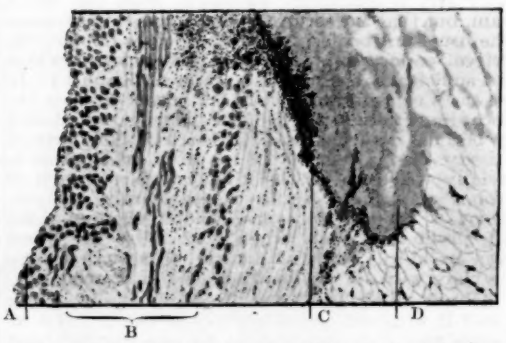
Bullock and Cramer, in the course of their work, investigated the defence-rupture phenomenon in streptococcal infections as a control to their

observations on gas gangrene. I have repeated some of their experiments and can fully confirm their results.

I have used several strains of streptococci, including one isolated from a normal throat, one from a case of puerperal sepsis, and one from a fatal case of cellulitis and have found them all practically non-pathogenic for the mouse. Injected into the subcutaneous tissue they produce a small abscess which remains localised and disappears in three or four days, leaving nothing but a microscopic scar. If, on the other hand, calcium chloride is added to the suspension of streptococci a very extensive spreading abscess is produced which invades the body wall and causes ulceration of the skin. And whereas streptococci inoculated alone into the subcutaneous tissue of the mouse appear to remain entirely localised, if they are inoculated together with calcium they pass beyond the bounds of the local lesion, for, in several cases, I have recovered them from the heart blood, although I have not succeeded in doing this when they have been inoculated without the calcium. At the same time the absolute pathogenicity of the streptococcus is not apparently increased by the calcium, for mice remain healthy with very extensive lesions for periods of a week or even longer. What are the essential differences in this reaction? In both the introduction of the streptococcus causes an acute inflammatory reaction, with a profound exudation of polynuclear leucocytes and proliferation of the fixed connective tissue cells. But in the streptococcal-calcium lesions the organisms proliferate to a very much greater extent than they do in the pure streptococcal lesions. And this does not appear to be due to diminished phagocytosis, for in the calcium reaction there is as abundant an emigration of leucocytes as in the pure streptococcal reaction, and these leucocytes are just as actively phagocytic. It would seem rather that the streptococci do not find a favourable medium for their growth in the normal tissue fluids of the mouse. In the pure streptococcal lesion the centre of the abscess is necrotic and contains large numbers of cocci. But these cocci do not undergo progressive proliferation to any extent; in fact, they appear to die and disintegrate within a few days, for I have tried more than once to produce an exaggerated lesion by inoculating calcium into the flanks of mice bearing streptococcal abscesses at varying times after infection but without success. It would seem that the vitality of the organisms in these healing abscesses is rapidly lost. In the calcium lesions, on the other hand, the cocci take full advantage of the intense œdema produced by the metal and undergo a remarkable progressive proliferation. It is commonly stated that, in acute infections which are being successfully resisted the invading organisms are shut off from the rest of the body by a zone or wall of leucocytes. But I am rather inclined to think that this is more apparent than real, for I have repeatedly observed in pure streptococcal lesions diffuse inflammatory foci in which the margins are quite undefined, though it is certain that such lesions are not developing ones. Possibly the plugging of the peculiarly large lymphatics of the subcutaneous tissue of the mouse with masses of leucocytes has been mistaken for incapsulation; at any rate, I have seen this kind of thing in the streptococcal-calcium lesions in conjunction with the diffuse cellulitis which is characteristic of this reaction; and, in passing, I may point out that the streptococcal-calcium lesions bear a most striking resemblance to the pure streptococcal cellulitis occurring in the human being. (Fig. 5.)

I do not think that by simple histological work we shall be able to determine exactly how the calcium modifies the streptococcal infection; the changes are rather too subtle to be appreciated. And I have, in conjunction with my colleague, Dr. John Mills, endeavoured to throw some light on this question by modifying the experimental conditions in various ways. I need not labour the point that the possibilities of experimental error in this kind of work are very considerable; so many factors are capable of accidental variation that each experiment must be repeated many times before one can place very great reliance on the results obtained. Our work is really only in its infancy and, therefore, our conclusions are purely tentative. There is evidence to show that the actual amount of calcium trauma is a more important factor than the number of infecting organisms introduced or the virulence of the strain used. I have obtained, as a general rule, far more pronounced defence-rupture with larger doses of calcium than with smaller doses, with 10 mg. than with 5 mg. And this result does not seem to be due simply to an exaggeration of the initial calcium lesion; it is not, as it were, an expression of the simple addition of the two lesions, because the initial calcium effect would be entirely lost in the massive end-result. But it would appear that the more abundant œdema produced by the larger dose of calcium permits of the proliferation of the cocci in situ which determines the severity of the resulting infection. Again, the defence-rupture phenomenon occurs, in our experience, more readily in the earlier than in the later stages of calcium poisoning. This is illustrated by the following experiment, and is, indeed, in agreement with certain observations made by Bullock and Cramer in their work on gas gangrene (Fig. 6). Of 14 mice, 7 were inoculated on one day with calcium into the right flank and magnesium nitrate (which is incapable of producing defence-rupture) into the left flank. The next day the other seven mice received similar inoculations, and the following day the whole 14 animals were inoculated into the tail veins with streptococcal suspension. The animals were killed at intervals of three or four days, when it was found that, in the first seven, with one slight exception, the only difference observable in the two flanks was obviously due to a pure calcium effect; whereas, in the second seven, three exhibited very pronounced spreading abscesses in the calcium flanks, though nothing of the kind was present in the magnesium flanks, and in two others the same difference was noted, though in a minor degree.

FIG. 5.



Streptococcal cellulitis in the mouse 72 hours after subcutaneous injection of streptococci and calcium chloride. A, peritoneal surface. B, Muscle of abdominal wall. C, Spreading leucocytic zone at the margin of the lesion. D, Area of tissue necrosis.

Diphtheria-Calcium Lesions.

It is possible that the extensive proliferation of the cocci in the early calcium coagulum may permit of the elaboration of a sufficient amount of soluble toxic to modify the infective process; and we, therefore, determined to repeat some of these experiments, using diphtheria bacilli instead of streptococci. It is usually stated that the diphtheria bacillus is non-pathogenic to mice and I may say at once that we have not yet succeeded in killing mice with them. But at the same time the local reaction produced by this organism is quite as extensive as that produced by the streptococcus. If washed diphtheria bacilli

are inoculated into the subcutaneous tissues of the mouse an acute abscess forms in a few hours and remains more or less localised. The inoculum becomes invaded with polynuclear leucocytes which phagocytose bacilli with great readiness. Many of the leucocytes are so packed with bacilli that their nuclei are quite obscured. In course of time the centre of the abscess breaks down and bacilli may proliferate in this necrotic zone to some extent. But the inflammatory process does not spread, the organisms are eventually destroyed, and healing takes place in the usual way. If calcium chloride is inoculated along with bacilli a very different result is obtained. I have never seen lesions so extensive as can be produced with streptococci, but the diphtheria-calcium lesions are, as a rule, very much larger than the pure diphtheria lesions. Further, they differ histologically. The initial œdema appears to be even more important to the diphtheria bacillus than to the streptococcus, for the bacilli proliferate enormously and, although leucocytic emigration is pronounced, yet the resulting abscess is never strictly localised. Zones of leucocytes packed with bacilli occur, but a fibrinous exudate tends to persist, on the surface of which bacilli proliferate abundantly. Indeed, making allowances for the fact that we are dealing with a more or less solid tissue instead of a mucous surface, the whole lesion is strongly reminiscent of the human diphtheritic membrane (Fig. 7). It is possible that more toxins are liberated by the diphtheria bacilli than by the streptococci, but we have not, as yet, observed anything which could be called a general toxæmia. In our experience, the virulence of the strain of streptococcus employed is not of predominant importance, but different types of diphtheria bacilli do appear

FIG. 6.

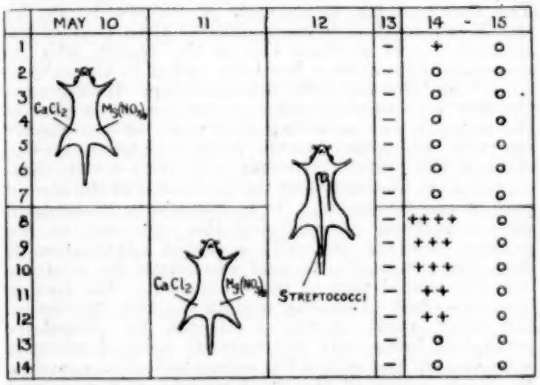


Chart of an experiment showing the determination of streptococci from the blood into early calcium lesions.

to act in different ways. Some give rise to much more pronounced lesions in mice than others, and the reaction is not so profoundly modified by the calcium. At the same time the importance of a fairly large dose of calcium becomes apparent when dealing with less virulent strains.

I do not think it would be justifiable to discuss these experiments in any greater detail at present. As you may imagine, even in these preliminary investigations all sorts of interesting suggestions have arisen, and until they have been put to the proof, it would be very unwise to theorise further. But I feel sure that the work along these lines must eventually throw valuable light on the process of infection.

TUBERCULOSIS AND SILICA: MINERS' PHTHISIS.

It is quite impossible to be interested in infection without turning one's attention sooner or later to tuberculosis, and, from our point of view, this disease is of peculiar importance. It is generally recognised that most of the inhabitants of civilised countries are infected with the tubercle bacillus at some period of their lives, and that most of these infections are successfully overcome; indeed, considering the ubiquity of the tubercle bacillus its pathogenicity is remarkably low. Nevertheless, a considerable number of people do die of tuberculosis every year, and this can only happen if there is some modification of what we may call the average infection. For the most part we have no conception of the nature of this modification, but the study of industrial diseases reveals one important contributory factor. It is well known that individuals who are exposed to

FIG. 7.

Diphtheritic inflammation in the mouse 67 hours after the subcutaneous injection of diphtheria bacilli and calcium chloride. A, External leucocytic zone. B, Semi-necrotic subcutaneous tissue. C, Necrotic zone showing masses of diphtheria bacilli.

dusts containing silica are liable to develop chronic pulmonary fibrosis, and are peculiarly prone to pulmonary tuberculosis; and in the gold-mining industry of South Africa the incidence of this so-called miners' phthisis has been so high as to necessitate a special organisation to deal with it. But though it is agreed that silica aids the development of the tubercle bacillus in the human body its mode of action is not definitely known. It would take too long to discuss the pathology of miners' phthisis in detail, but we may take it as accepted that silica is a protoplasmic poison, and that when it comes into contact with the tissues it slowly changes into a soluble form and produces its effect by chemical not physical means. Fibrosis alone, however, can scarcely render a lung hypersusceptible to the tubercle bacillus; there must be something more in the accessory action of the silica than this. Trying to elucidate this matter Dr. W. E. Gye and I compared the lesions produced by inoculating tubercle bacilli together with silica into the subcutaneous tissue of mice with those produced by inoculating the bacilli alone. We found that if we added silica to our inoculum the bacilli proliferated enormously in the centre of the necrotic zone, whereas without the silica the organisms remained practically quiescent and gave rise to scarcely any tissue reaction. It seemed obvious that this bacterial growth might be due to three possibilities: (1) the coagulum might protect the organisms mechanically during the early days of their lodgment in the body; (2) the disintegrated cells might furnish an unusually favourable pabulum; (3) the silica might act as a direct stimulus to the growth of the bacilli. In the first two possibilities the silica would act simply by causing necrosis of tissue, but in the third it would act specifically on the bacillus rather than on the host. To test this matter further, I used the technique of the fixation abscess. In this method a silica lesion is produced in one flank of a rabbit or mouse, and in the other flank an abscess is brought about by some such agent as calcium or turpentine. The animals are then inoculated intravenously with tubercle bacilli, and the lesions are examined in a fortnight or three weeks' time for the presence of the organisms. I have found that whereas tubercle bacilli are almost invariably

present in large numbers in the silica lesions, they only occur in small numbers in the control lesions, and this, in spite of the fact that the necrosis produced by calcium and turpentine is much more extensive than that caused by silica. Simple necrosis of tissue, therefore, is not the explanation.

The possibility that silica is a direct stimulus to the growth of the tubercle bacillus may be studied in vitro, and I have made many attempts to enrich culture media by adding various quantities of silica to them, but my results have been too inconclusive to be of much value. Similarly I have tried to alter the development of an artificial miliary tuberculosis by treating animals with silica before inoculating them intravenously with bacilli. Inasmuch as the same cells, the reticulo-endothelial cells, phagocytose both silica and tubercle bacilli, I thought it possible that if I gave my rabbits a preliminary course of silica intravenously they might react differently when infected with tubercle bacilli by the same route. But here again my results have been inconclusive. In some animals the silica appeared to cause a pronounced exaggeration of the infection, but in others it seemed to cause exactly the reverse. It may be that the preliminary treatment with silica has to be very carefully adjusted. Too much silica may so poison the cells as to interfere with their phagocytosis of the bacilli, and this is a point which I am investigating at present.

As the matter now stands, therefore, we cannot claim that we understand exactly how silica acts in increasing the susceptibility of the tissues to infection with the tubercle bacillus. But that it actually does so is beyond all doubt, and in miners' phthisis we have an infection in which the influence of a third or accessory factor is clearly manifest.

CONCLUSION.

In conclusion I would suggest to you that inflammation is not a stereotyped process or sequence of changes which occurs in the tissues in response to irritation, but that it is a variable phenomenon which alters its characters according to type of stimulus which calls it forth. Different irritants produce different results, and it should be possible to distinguish the nature of the irritant from the type of the reaction. And since microbic infection necessarily implies inflammation, it should be possible for us to recognise different types of inflammation corresponding to different groups of pathogenic organisms. This being so, it seems highly probable a closer study of microbic inflammation will reveal specific tissue changes which may be of significance in the attempt to combat these infections. If we understand exactly why particular bacteria make good their footing in the tissues, and how the tissues respond to their presence, it may be possible for us to devise logical methods of modifying or combating infection. It is, at any rate, a line of inquiry which I commend to your notice as having interesting possibilities.

I should like to express my indebtedness to my laboratory assistants, Mr. Armstrong and Mr. Napper, for much invaluable help in the preparation of the material for these lectures.

BRISTOL'S CRIPPLED CHILDREN.—It has been decided to amalgamate the Orthopædic Hospital and Home for Crippled Children of 36 beds, at Redland, and the Bristol Crippled Children's Society. A site has been obtained for a new building to provide ample facilities for open-air treatment.

HOSPITALS CONTRIBUTORY SCHEME FOR BIRMINGHAM.—For some time past the desirability of establishing a contributory scheme has been under consideration at Birmingham. The city's hospitals council recently unanimously approved the scheme and it has now been accepted by the Board of Delegates of the Birmingham Hospital Saturday Fund, the organisation of which will continue to be utilised. This step is a necessary accompaniment of the pending reorganisation of the hospital service of Birmingham which at present provides a number of beds not only inadequate to the needs of the district but smaller in proportion to the population than in some other great towns.

ANTIPERISTALSIS OF THE DUODENUM

AND ITS RELATION TO PYLORIC REGURGITATION.

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ANTIPERISTALSIS has not yet been demonstrated to occur as a normal event in any portion of the alimentary canal in man, although it is assumed to occur in the ascending colon from the X ray observations of Cannon [1] and the experimental work of Elliott and Barclay-Smith on various animals.[2] The mixing of the food with the bile and pancreatic juice in the duodenum is supposed to be accomplished by segmentation movements after the fashion of the small intestine, and Cannon,[3] describing these duodenal movements in the cat, says that "the to-and-fro movements of the particles may be a relatively extensive and very energetic swinging." Starling, speaking of intestinal segmentation movements, says that "these movements have not a translatory effect, and a column of food may remain at the same level in the gut for a considerable time."[4] Cannon makes no mention of antiperistalsis, and it has not apparently been recorded. It appears to us, however, that no other force than that derived from antiperistalsis will explain the movements we describe in the duodenum in this paper. The peristaltic movements of the duodenum are very energetic and, if the onward movement of the food is due to them, the same and equally energetic movement backwards may be reasonably assumed to be due to antiperistalsis. The study of the movements of the duodenum by the X ray method is more difficult than that of the stomach; and perhaps this is the reason why no important information has been added to the subject since Cole [5] described the duodenal cap. He regarded the first part of duodenum as being really a part of the stomach and as acting as a more or less passive reservoir, which receives the gastric contents expelled through the pyloric sphincter, and from which these contents are abstracted by the peristalsis of the second part of the duodenum. It is difficult to understand such a method of emptying the cap, and at the present time the generally accepted explanation is that the cap contracts and discharges its contents into the second part of the duodenum. The food is then described as passing rapidly through the second and third parts of the duodenum by propulsive peristalsis, being only momentarily delayed whilst it is broken up and mixed by segmentation movements. No delay occurs at the duodeno-jejunal flexure and the food passes directly into the jejunum; slight backflow has been described as occasionally occurring from the third to the second part of the duodenum. If these are the normal movements of the duodenum it is impossible to understand how duodenal regurgitation into the stomach can occur. It was, however, shown by Bolton and Goodhart [6] that regurgitation of duodenal contents into the stomach is a normal event regularly occurring at a definite time, varying in different persons, towards the end of gastric digestion. This regurgitation of alkaline material occurs when the curve of HCl acidity of the gastric contents has risen to an approximate height of 0·2 per cent., and the latter are neutralised, the process being usually completed before the stomach is empty. This regurgitation they regarded as being entirely dependent upon relaxation of the pyloric sphincter when the acidity has attained its average normal height. The acid curve thus imparts information as to the condition of the pyloric sphincter, and this is practically its only value in diagnosis.

Action of the Pyloric Sphincter.

It was shown that three conditions of sphincter action exist.[7]

1. The *normal* as stated above, in which the acid curve shows a simple rise and fall, the peak of the curve denoting the point of time at which relaxation of the sphincter occurs.

2. *Hypertension or spasm of the sphincter*, in which it acts in the normal fashion in the early stages of digestion, but fails to relax at the appointed time, so that neutralisation does not occur, and the acid curve either maintains its level or continues to rise. This is the functional disturbance of the stomach known as hyperchlorhydria, the commonest of all gastric disorders, in which the symptoms appear in the later stages of digestion when the pylorus refuses to relax. Several types of this condition exist, according to the action of the pylorus.

3. *Excessive relaxation of the pylorus*, in which relaxation occurs from the beginning of digestion; regurgitation and neutralisation commence at once, bile is usually present in the gastric contents, and the condition of achlorhydria is established.

At first sight this explanation of sphincter action does not appear to satisfy all demands, for if the pylorus relaxes excessively as in the third condition the stomach might be expected to empty more rapidly than normal, which is, however, not necessarily the case. A difficulty is also presented by the class of case in which the stomach empties rapidly and yet neutralisation fails to occur. The explanation of these anomalies will be given later.

Movements of the Duodenal Contents.

To understand precisely the action of the pyloric sphincter is without a doubt the first step in the elucidation of functional disorders of the stomach. The acidity of the gastric contents is quite a secondary consideration, and so long as the sphincter acts normally the amount of gastric juice secreted is of little moment. It is thus of first importance that the exact movements of the duodenal contents and the part played by the pylorus in the process of their regurgitation into the stomach should be clearly explained. For this purpose a series of 100 cases has been studied and four distinct movements have been observed.

1. Contraction of the cap (first part of duodenum).
2. Peristaltic contraction of the duodenum (other than the cap), propelling the contents forwards.
3. Contraction of the duodenum (other than the cap), forcing the contents backwards, presumably antiperistalsis.
4. Segmentation or mixing movements.

These movements have been observed in normal cases, and also in such conditions as gastric ulcer, duodenal ulcer, gall-stones, new growth of stomach, gastro-enterostomy with patent pylorus, appendicitis, and pyloric stenosis.

Of these four movements we are in this paper chiefly concerned with antiperistalsis. *Antiperistalsis* was observed in 93 per cent. of the cases, and is evidenced by swaying or regurgitant movements backwards towards the pylorus. It appears to be due to actual contraction of the duodenum and is just like peristalsis, but in the opposite direction. The cap contracts and passes the food into the second, and sometimes, the third part, of the duodenum. An antiperistaltic wave is initiated, and sways the food back like a pendulum for varying distances; it often passes back into the cap, which it may distend, and is then held up by the pyloric sphincter; or it may fall short of this point. A peristaltic wave propels it onwards again and an antiperistaltic wave returns it. If food has in the meantime left the stomach the two portions mix together. There is no rule as to how many times the food mass may thus swing backwards and forwards; the first peristaltic wave may drive it into the jejunum or it may take several waves to force it into this part, but once in the jejunum it does not appear to return to the duodenum. The most active antiperistaltic movements occur in the second part, but the food mass may swing back from any part of the duodenum. It may be temporarily held up at the duodeno-jejunal flexure, but not more often than at any other point, and there is no visible evidence of a definite sphincter action at this position. In every case the cap is periodically filled or partially filled by antiperistalsis of the duodenum, and the only barrier to regurgitation into the stomach is the pyloric sphincter. These movements go on until the stomach is empty; they become less evident as the stomach empties, although at this stage the food tends to be held up for a longer time in the duodenum. The peristaltic and antiperistaltic movements apparently occur independently of each other or of the gastric movements. They may occur alternately, with a regular rhythm for a time, or quite irregularly. This swaying movement must be a more efficient mixing agent than the segmentation movements.

Regurgitation into the Stomach.

Regurgitation into the stomach was directly observed in six cases only, and this small percentage is no doubt due to the difficulty in detecting the opaque emulsion passing back through the narrow pylorus. We are therefore not in a position to speak more positively than as follows. Regurgitation only occurs now and then, and certainly not with every antiperistaltic wave. This agrees with the fact that the neutralisation is not a rapid process, as shown by the relatively slow descent of the acid curve. When regurgitation was observed there was no doubt whatever that the pylorus was relaxed between the gastric peristaltic waves, because the food was seen to pass right back into the stomach through the cap, owing to the impetus imparted to it by the second part of the duodenum. Regurgitation into the stomach would no doubt always occur when food regurgitated into the cap, if the pylorus was relaxed at the moment, and provided also that the reflux was not prevented by a peristaltic wave of the stomach. So far as these observations go at present there can be no doubt that this is the case. The most reasonable hypothesis to advance is that the pylorus commences to relax independently of the gastric peristaltic waves as digestion proceeds, and regurgitation occurs from time to time. When the stomach is empty it is well known that the pylorus is relaxed independently of gastric peristalsis, and this relaxation no doubt normally begins before the stomach is empty. The conditions in the duodenum are favourable to regurgitation and, if the pylorus relaxes, it is merely a question of difference of pressure in the duodenum and stomach. Marbaix [8] many years ago registered a duodenal pressure of 10 cm. to 15 cm. water, and Payne and Poulton [9] in a normal person found the mean pressure to be 14 cm. with rises to 18 to 20 cm. With a relaxed pylorus these pressures are quite sufficient to overcome the mean intragastric pressure which is commonly below 10 cm. water; but, since with a peristaltic contraction of the stomach the pressure in the pyloric end rises to 20 cm. or 30 cm. water or even higher, regurgitation from the duodenum would be impossible at such a moment.

In the present state of our knowledge we must conclude that when the stomach is filled with food the pyloric sphincter assumes its postural tonus and relaxes only before gastric peristaltic waves; when the stomach has emptied to a certain point the sphincter commences to relax also between the peristaltic waves and pyloric regurgitation occurs from time to time; when the stomach is empty the pyloric tonus is low and the pylorus remains open for many minutes at a time, allowing free regurgitation of intestinal fluids. A certain amount of leakage no doubt occurs in some cases even in the early stages of digestion, as now and then the curve of inorganic chlorides rises to a certain extent, and we have observed regurgitation within a quarter of an hour after taking food.

The pyloric sphincter has thus the two functions of regulating (1) the output of the stomach, and (2) the regurgitation of the duodenal contents. The latter is the principle recognised some years ago by Boldyreff from animal experiments. These two functions are both disordered together in pyloric hypertension or spasm, when retention of food occurs along with deficiency in the neutralisation of the gastric contents. Relaxation of the pylorus between gastric

peristaltic waves may occur from the beginning of digestion, giving rise to the presence of bile in the stomach and achlorhydria, whilst the function of controlling the output of food remains normal and the stomach does not empty at an abnormal rate. Here is the explanation of the anomaly mentioned at the beginning of this paper that excessive regurgitation my occur, although the stomach does not empty more rapidly than normal. The second anomaly—namely, that the stomach may empty very rapidly and yet the acid curve continue to climb and the contents remain unneutralised—also receives an explanation; for, although the pylorus may be of low tone, yet when the stomach empties very rapidly the duodenal conditions are unfavourable to regurgitation, owing to the rapid rush of the food through the duodenum.

Summary.

1. Antiperistalsis is a normal movement of the duodenum. Its effects are to delay the food in the duodenum, to ensure its admixture with the digestive juices, and to produce conditions favourable to regurgitation into the stomach.

2. The duodenal cap is filled periodically from the duodenum, the pyloric sphincter preventing regurgitation into the stomach.

3. In addition to its function of regulating the output from the stomach the pyloric sphincter prevents regurgitation from the duodenum in the early stages of digestion; as digestion proceeds it commences to relax independently of gastric peristalsis, promotes regurgitation, and thus regulates the acidity of the gastric contents.

4. An actual swing back of food from the second part of the duodenum is not always necessary to produce regurgitation, since a full cap with a momentary relaxation of the pylorus will produce it as we have observed.

References.

1. Cannon: Amer. Jour. Phys., 1902, vi., 265.
2. Elliott and Barclay-Smith: Jour. Phys., 1904, xxxi., 272.
3. Cannon: Mechanical Factors of Digestion, 1911, p. 144.
4. Starling: Principles of Human Physiology, 1920, p. 772.
5. Cole: Archiv. of the Roentgen Ray, April, 1912, No. 141, p. 425: Amer. Jour. of Med. Sci., July, 1914, No. 1, cxlviii., 92.
6. Bolton and Goodhart: THE LANCET, 1922, i., 420.
7. Bolton: Brit. Med. Jour., 1923, ii., 269.
8. Marbaix: La Cellule, 1898, xiv., 251–273.
9. Payne and Poulton: Quart. Jour. of Med., 1923, No. 65, xvii., 69.

TWO CASES OF
ACUTE HEPATIC ABSCESS TREATED BY OPERATION.

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THE two following cases were met with at the Meath Hospital and County Dublin Infirmary within a few months of each other:—

CASE 1.—A boy, aged 12, with a well-nourished and well-developed body, was admitted complaining of sharp, severe pain in the upper abdomen, which had come on suddenly a few hours before. It hurt him to move about in bed or to breathe deeply or to cough. His pulse was 100, his temperature 99° F. His bowels had moved on the previous day and he had not vomited. For a fortnight before the night of admission he had had occasional vague pain in the belly but he had taken little notice of it and had not gone to bed.

On *examination* his abdomen was found to be rigid and immobile, especially in its upper part; there was marked tenderness about the umbilical region. The tongue was furred, the pulse fairly good, and the lungs normal. Generally speaking, the case was not unlike one of perforated duodenal ulcer.

At *operation* the omentum was found adherent to the duodenum and liver. Its free edge had turned upwards and was wedged between, and adherent to, these organs. It seemed at first that a perforated duodenal ulcer had been sealed over by the omentum, but on separating the omentum from the duodenum, which was easily done, it was found that the duodenum was intact and quite healthy. We then proceeded to separate the omentum which was still adherent to the liver, and were surprised to see a bead of pus oozing from the surface of the liver which had been covered by omentum. The pus was wiped away and in the liver we saw a small hole with necrotic edges; on pressing near this hole more pus came out. A closed artery forceps was passed in through the hole, its blades were gently opened, and the pus came out freely. The abscess cavity was about three-quarters of an inch deep by half an inch wide. It was on the inferior surface of the liver close to the anterior edge and in the left lobe. The liver immediately around the abscess seemed to be in every way normal.

A soft rubber tube was passed into the cavity. The omentum was first twisted round the tube and then the tube was brought out through a hole in the omentum, a point or two of fine catgut being employed to keep the omentum in place. The tube was brought out through a stab wound 1 inch to the left of the middle line. The abdominal wound was closed in the usual way. Convalescence was uneventful. Pus discharged through the wound for four or five days, the laparotomy wound healed by first intention, and the boy left hospital quite well in three weeks. Microscopic and cultural examinations of the pus showed the presence of *Staphylococcus aureus*.

It was fortunate that this was our first case of the kind. The adhesion of the omentum to the liver led us straight to the trouble, and operative diagnosis was easy to establish. We were able to recognise the lesion in the second case only because we had the first one fresh in our minds.

CASE 2.—A man, aged 29, was admitted to the Meath Hospital at midday. He was very cold, with a subnormal temperature and an all but imperceptible pulse; his face was yellow, pinched, and haggard; his lips were blue. He was able to give very little account of himself, but stated for the last 24 hours he had severe continuous pain in the right hypochondrium. He had vomited any food he had eaten; his bowels had moved. That morning the pain had become intolerable and he came to hospital. He had not been feeling well during the previous week.

On *examination* the abdomen was found rigid and immobile especially in its upper part, and there was marked tenderness over the gall-bladder area. The lungs and urine were normal. He was diagnosed as suffering from an acute abdominal complaint, probably suppurative or gangrenous cholecystitis. Owing to his collapsed condition, we waited for some hours to allow a rectal saline, morphia, digitalin, and hot-water bottles to improve his condition.

Operation.—The belly was opened through a right paramedian incision and revealed at once a normal gall-bladder. The lesser omentum was bile-stained near its hepatic attachment. The peritoneum, appendix, duodenum, stomach, spleen, and colon were all rapidly examined and found normal though slight enlargement of the spleen was noted. When examining the gall-bladder we noted a circular white patch about half an inch diameter, flat, and not raised above the surface, on the anterior surface of the adjacent liver. On re-examination of this patch we came to the conclusion that it was a peritoneal scar, though it had a superficial resemblance to a Farr's tubercle.

We examined the liver carefully, primarily for malignant disease, but also with Case 1 present in our minds. Just to the right of the falciform ligament, on the anterior surface of the liver, there seemed to be bulging of the organ, localised midway between the bare area and the anterior edge. It was under the ribs. The bulge appeared to be about 2 inches in diameter, and we thought that fluctuation was present. Accordingly we dragged the liver gently down and had a look. The tension on the liver smoothed out the bulge we had felt, and the surface of the suspected area was in no way different to the surrounding surface, but on inserting a trocar of moderate size pus escaped from the cannula. We packed off the area and opened the abscess by the Hilton technique. It was near the surface and there was very little hæmorrhage but a great deal of pus. We plugged the cavity with a sponge and had another look at the scar. We tested it for fluctuation and were doubtful. We tested it with the sterilised trocar and a little pus escaped.

We opened a little abscess as before. We examined the liver very carefully and found two more areas where fluctuation was present and dealt with these similarly. They were quite small and all to the right of the falciform ligament and on the anterior surface. The left lobe was normal. We removed the gauze from the first abscess and led drains down into the abscess cavities, turning up the omentum to the anterior edge of the liver and stitching its free edge to the falciform ligament and parietal peritoneum in such a way as to act as a barrier between the affected area and the general peritoneal cavity. The two drains were brought out through stab openings at either side of the original wound, which was completely closed.

The patient's cardiac and general condition improved at once, but he was very restless and for some nights delirious. His temperature went up for some days to 101° F. He then further improved, the delirium stopped, but the restlessness continued. Fourteen days after the operation he attempted to get out of bed and his wound, which appeared to have healed, burst open right down to the peritoneum. It was sewn up at once with silkworm-gut under general anæsthesia. He subsequently stayed quiet, the wound healed rapidly, and he left the hospital a few weeks later.

Bacteriological examination of the pus in this case also showed the infective agent to be *Staphylococcus aureus*.

The causes of hepatic abscess, as given in a standard text-book of surgery, are, besides trauma and tropical abscess, "pyogenic infection of the biliary passages or . . . . any infective lesion in the territory of the portal vein, such as appendicitis, typhoid fever, or actinomycosis of the cæcum." Colitis is also mentioned, and some text-books lay stress on the importance of the suppurative pile. We have seen, at autopsy, an enormous liver abscess due to *Streptococcus hæmolyticus*, in which the primary focus was an abscess of the lung following pneumonia, infection having reached the liver by direct extension of pus through the diaphragm.

In both our cases a careful general examination, paying particular attention to the rectum, was subsequently made to discover the source of infection of the liver, but none was found. From the practical point of view, whilst these cases are, of course, very rare, it is obvious that they will not be recognised unless the possibility of their occurrence is borne in mind. In the two cases described the symptoms were those of the acute abdomen; in one case the symptoms resembled those of a perforated duodenal ulcer, and in the other they pointed to a suppurative cholecystitis. But a study of them failed to furnish anything which would enable us to recognise a given case as being one of acute localised hepatic abscess. The operative diagnosis was made, during operation, on (1) omental adhesions, (2) localised swelling of normal-looking liver with underlying fluctuation, (3) the results obtained with the trocar and cannula. In Case 2 there was a white plaque on the peritoneal surface of the liver over one of the abscesses. The diagnosis in Case 2 was made, practically speaking, by means of the trocar and cannula.

The treatment adopted in these cases calls for no comment. We cannot dogmatise from two cases about prognosis, but Case 2 proves that even a severe case may recover.

THE LATE MR. W. E. BENNETT.—At the age of 62 Mr. William Edward Bennett died on June 4th at his home at Keresley, near Coventry. He was a son of the late Mr. William Bennett, who built the Royal Opera House, Coventry. Studying medicine at the Universities of Birmingham and Paris and at St. Bartholomew's Hospital, he qualified as L.R.C.P. Lond. in 1890, became F.R.C.S. Eng. in 1895, and graduated as M.B. at Birmingham in 1902. Before embarking on surgical practice he gained much experience as resident officer at the Queen's Hospital, the General Hospital, and the Jaffray Hospital at Birmingham. Many years ago he began to specialise in orthopædic surgery, and at the time of his death was senior honorary surgeon to the Royal Orthopædic and Spinal Hospital, Birmingham. He had also been for 21 years surgeon to the Coventry and Warwickshire Hospital, and was honorary demonstrator in anatomy in the University of Birmingham. During the late war Mr. Bennett held a commission in the Royal Warwickshire Regiment, T.D., and was visiting surgeon to the 1st Birmingham War Hospital.

AN OUTBREAK OF PARATYPHOID "B" FEVER CONVEYED BY ICE-CREAM.

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With a CLINICAL REPORT *by* G. L. LEGGAT, M.B., CH.B. EDIN., D.P.H.,
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AN outbreak of paratyphoid B fever with 63 diagnosed cases occurred in the city of Norwich, beginning in the month of June, 1926. Its investigation produced some points of interest and the literature concerning ice-cream and paratyphoid fever is not extensive.

The records for enteric fever of the last few years showed, in the summary, in—

	Cases in the first six months.	Cases in the second six months.
1924	2 ..	.. 9
1925	4 ..	.. 10
1926	10 ..	.. —

With these figures under consideration on June 30th the possibility of an outbreak was foreseen.

Of the latter ten cases the last two are of interest here. One, a para. B case, was notified from the northern outlying part of the city, with an onset on May 22nd and the origin was untraced, though the usual possibilities (shell-fish, &c.) were present. As this case occurred nearly three weeks before the outbreak in an entirely different part of the city with no traceable connexion with the outbreak, it is not classed among the 63 cases, but as a sporadic case. The other of the two, a case of para. B fever, was the first case (S. W.) of this outbreak, a boy of 11 years with an onset about June 10th.

The Outbreak.

On June 29th two girls (G. T. and A. B.) were suspected to be suffering from enteric fever. This was subsequently confirmed by Widal reactions as para. B and their onsets were on June 24th.

One of these (A. B.) was a case of considerable importance. The first Widal, taken a little early, was negative; she was very constipated, she had been away to the seaside for three weeks, returning to Norwich on Saturday, June 19th, and there was a certain amount of influenza about. She was, therefore, at first considered not to be a case of enteric fever. However, a confirmatory Widal was done later, which was positive to paratyphoid B, and she also developed some typical spots. Therefore, if she received her infection in Norwich, which was extremely probable, it must have been between her return to Norwich on the 19th and her onset on the 24th. Later inquiries showed that on her return to Norwich she had an ice-cream from the infecting source on the 19th, on her way from the station to her home. This fixed her incubation period at five days very accurately. On the 30th several cases of an uncertain nature were reported to me and Widal specimens were taken on the appropriate dates. These proved to be practically all positive. A circular letter was sent to the practitioners of the city calling attention to the outbreak.

Notifications were received as under: Week ending June 26th, 1; July 3rd, 1; 10th, 25; 17th, 14; 24th, 12; 31st, 7; August 7th, 1; 14th, 2.

All the cases were confirmed by positive Widal tests by Dr. G. P. C. Claridge, who used living cultures, and throughout this outbreak took as his standard a dilution of 1 in 40 with a time limit of two hours. The disease in most cases was very mild, so that it is very likely that there have been some missed cases. In fact, some were discovered by accident at the school clinic late in the disease, the diagnosis being confirmed by a Widal test. There were no deaths.

Tracing the Infection.

It was soon recognised that all the cases were coming from one comparatively small area in rather a poor part of the city. A little spread occurred later, owing to visiting. Moreover, Dr. Leggat was early impressed with the fact that the great majority of the cases were young girls and this, coupled with the hot weather at that time, made him suspect ice-cream. An inquiry sheet showing the suspected articles of diet and inquiry amongst the cases in the isolation hospital tended to confirm this, and implicated a certain ice-cream stall, "A," recently set up in the middle of the affected district. On July 6th I stopped the sale of ice-cream from the stall "A." However, not all the cases gave a history of ice-cream from this stall. In particular three girls (M. M., K. C., and D. B.) denied it, but M. M. and D. B. gave a history of ice-cream from other supplies, shop "B" and barrow "C." On inquiry, stall "A" got the milk for making ice-cream from a certain dairy, "X," and so did shop "B" and barrow "C," and dairy "X" supplied some milk to the household of the girl K. C. Therefore dairy "X" appeared to be implicated, and I visited it on July 6th. I found a man and wife (Mr. and Mrs. "X") with four sons ("X" 1, "X" 2, "X" 3, "X" 4), a hired lad, "X" 5, and a serving girl, "X" 6, working the dairy. "X" 2 had a decided attack of jaundice when seen on July 6th and gave a history of being off colour a fortnight before to such an extent that he had gone once to his doctor, but had continued as a roundsman. Although jaundice is only rare in enteric fever, I stopped him from work until further investigations could be made, but I did not feel justified in closing the dairy. At my request Dr. W. P. Yetts was sent from the Ministry of Health on July 7th to assist in the investigations; I am very greatly indebted to him for his advice and help, which were invaluable.

Stall or Dairy?

Thus far, the two probable sources of infection seriously suspected were stall "A" and dairy "X," but in the meantime, all the cases then being notified were throwing more emphasis on stall "A" to the exclusion of all other sources.

A Widal test and bacteriological examination of the stool and urine of each member of the "X" household showed that:—

Mrs. "X" had a negative Widal and urine, but her stool contained non-lactose fermenters which gave para. B sugar reactions but did not agglutinate with the para. B serum.

"X" 1 had a slightly positive Widal—i.e., one hour in 1 in 40. This was complicated by the fact that he had been inoculated in 1916 with T.A.B. as his army pay-book showed. His stools were also examined. The first stool examined showed nothing abnormal, but a further stool, obtained by calomel and mag. sulph., showed the presence of non-lactose fermenters which agglutinated with para. B serum.

"X" 2, the son who had the jaundice and previous indisposition, had a negative Widal with a negative urine, but his stool showed the same non-lactose fermenters as Mrs. "X."

Mr. "X," "X" 3, "X" 4, "X" 5, and "X" 6 all had negative Widals, stools, and urines.

The fact that non-lactose fermenting organisms with the correct sugar reactions of *B. paratyphosus* B did not agglutinate with para. B serum had to be discounted to some extent, owing to the opinion, expressed in many books, that true organisms if *recently* isolated might fail to agglutinate with the appropriate serum, so that these organisms in spite of non-agglutination might have been para. B bacilli and the cause of the outbreak. However, there has been no evidence in this outbreak of this failure of agglutination in newly isolated organisms. "X" 1 was removed to the isolation hospital for observation, Mrs. "X" and "X" 2 were requested to leave the dairy premises entirely, which they did as the alternative to having the dairy shut down altogether; the dairy was thoroughly cleansed and everything which could be boiled, including glass milk bottles, was boiled, and such utensils as brushes were burnt. Notices to Mrs. "X," "X" 1, and "X" 2 were served under the Public Health (Pneumonia, Malaria, Dysentery, &c.) Regulations, 1919.

Home Visits.

Visits were made to the farm supplying the majority of the milk to the dairy and a Widal taken of every member of the household and all the farm personnel, consisting of seven hands, who came into any contact with the milk, and all were interrogated as to their previous history. The dairy farm was also examined and the water tested. However, all the personal histories, the Widals, and the water tests proved negative and the farm had to be considered free. Moreover, inquiries showed that para. B had not been in the district for some years. In the meantime further cases were occurring and the histories obtained pointed more strongly to stall "A" and the investigation of that was started as soon as possible. Inquiry into the household showed the presence of Mr. and Mrs. "A," a daughter "A" 1, and a young female shop assistant, "A" 2. Mrs. "A," previously a public-house keeper, started to make and retail from Easter, 1926, ice-creams chiefly as halfpenny cornets and penny wafers from a stall outside their small drapery shop, with also a small trade in lemonade and wrapped confectionery. The family history of the "A" household showed that Mr. "A" had 30 years previously had some enteric fever called typhoid fever, but none of the others had ever had any such disease. However a Widal test and a stool and urine examination of every member of the stall "A" household was done. All were entirely negative to T.A.B. except Mrs. "A," who had a positive Widal to para. B (half an hour in 1 in 40 dilution) with stools full of non-lactose fermenters giving the sugar reactions of para. B and agglutinating with para. B serum. Therefore she was removed to the isolation hospital, and we felt confident she was the source of the outbreak as, on being questioned, "X" 1, who delivered the milk to the "A" household, remembered having on one occasion eaten ice-cream from Mrs. "A," so that, even if dairy "X" were implicated, Mrs. "A" might still be the originator of the outbreak. The prompt cessation of the outbreak fully confirmed this.

Release of the Dairy.

However, blood for a Widal and a sample of stool and urine from "X" 1, and cultures of the suspicious non-lactose fermenters obtained from other members of the "X" family had in the meantime been sent to the Ministry of Health bacteriological laboratory and they were all returned as negative with regard to para. B. As a fact the first specimen of stool from "X" 1 sent to the Ministry had been obtained by means of calomel and mag. sulph., and this proved sterile, an interesting point. However, other specimens contained the non-lactose fermenters. It was reported by the Ministry laboratory that these were not para. B organisms and that the "X" 1 Widal agglutination was so slight as to be negative. Therefore the control of the "X" dairy was released on July 20th. Two subsidiary supplies of milk to that dairy and the complete list of customers divided into separate rounds were about to be investigated when the arrival of these negative results removed the necessity, from the point of view of this outbreak.

The first case of the outbreak was notified on June 22nd with its onset on the 10th. The last case was notified on August 9th, with its onset on July 27th. The last case was discharged from the isolation hospital on Sept. 7th. The carrier, Mrs. "A," was discharged on Sept. 14th, though still an active carrier, as she was very depressed, requiring alcohol and bromide. She was served with a notice under the Public Health (Pneumonia, Malaria, Dysentery, &c.) Regulations, 1919, and given explicit instructions.

The Ice-Cream Stall.

Of the 63 cases of the outbreak all were found to have had some ice-cream from stall "A" or to be immediate contacts of such proved cases, with the

exception of four cases (M. M., K. C., H. C., and Mrs. K.). M. M. and K. C. admitted having had some of the ice-cream, though not for about four to six weeks before their onset, but they passed the stall daily on their way to and from work, and their history did not appear to be very reliable. In many cases the incubation period was very short, down even to a one-day doubtful possibility, but none were as long as 4–6 weeks with these possible two exceptions. They, moreover, had had some milk from the "X" dairy. This raises a very interesting question as to whether "X" 1 was temporarily slightly infected by the ice-cream he had eaten, but, owing to his T.A.B. inoculation ten years before, was able to resist it. The fact that his Widal was at first considered by an experienced bacteriologist to be positive suggests the possibility that his agglutinating powers, already in existence owing to his previous inoculation, had received a slight stimulus, but not sufficient to produce a lasting positive Widal. This can, of course, only be a matter for speculation.

H. C. is a young girl of 16, who very positively denied having had any of Mrs. "A's" ice-cream, and we could trace no connexion at all. However, she agrees to passing the stall occasionally, but in any case she started rather late in the outbreak and may well have been a contact with some other case, known or unknown. She worked in a factory where one other case worked.

Mrs. K.'s onset was July 27th. It is very doubtful whether she ought to be included in the outbreak or considered as a sporadic case. She had never had any ice-cream from the neighbourhood of stall "A"; she had had ice-creams, &c., elsewhere, and she had not been in contact with any known para. B cases.

Origin of Carrier State.

There is no evidence to show where Mrs. "A" got her infection or how long she has been a carrier. She denies having had the disease. She is, however, fond of shell-fish and she may have received an intermittent infection from this which raised her agglutinating powers and left her infectious. None of the "A" household contracted the disease, although "A" 1 and "A" 2 ate large quantities of the ice-cream. It is possible that the method of making the ice-cream accounts for this. The milk used was subjected in the evening to a crude pasteurisation process and the ice-cream mixture heated. This would be more or less sterilised for non-sporing organisms. The freezing was done next morning and care has to be taken not to let the freezing mixture come in contact with the ice-cream, or else the salt spoils the flavour. "A" 1 and "A" 2 naturally helped themselves, and so might remain free, but Mrs. "A" would handle freely the cornets and wafers. This is again only speculative.

In tracing contacts efforts were made to investigate those people having connexion with food, such as cases from a sweet shop or from a fish shop selling ready boiled shell-fish, &c. In those cases Widal tests and stool and urine examinations were made throughout the household. The stools and urine were examined before a case was discharged from the hospital to such a home, to a food factory, and also in the case of married women who would have to cook on their return home.

We were fortunate in many ways in this outbreak. In the investigation a very severe thunderstorm on June 16th helped many of the cases to fix their dates. Ample accommodation at the isolation hospital once again proved its value.

CLINICAL REPORT BY G. L. LEGGAT.

The outbreak of paratyphoid B fever which commenced in June, 1926, in the city of Norwich totalled 63 cases; 48 of these cases were admitted to the isolation hospital; the discovered carrier, a suspected carrier, and a five days old infant (born whilst its mother was suffering from paratyphoid), were also accommodated at the hospital for a time. Most of the cases were seen in their own homes before admission to hospital, and an opportunity was thus given of observing them at an earlier stage than is usual in hospital practice.

The first two cases of the series were admitted on Tuesday, June 29th, and further admissions were as under:—

July 4th	.. ..	2 cases	July 20th .. .. 3 cases
„ 6th	.. ..	2 „	„ 21st .. .. 2 „
„ 7th	.. ..	5 „	„ 22nd .. .. 1 case
„ 9th	.. ..	4 „	„ 23rd .. .. 2 cases
„ 10th	.. ..	3 „	„ 24th .. .. 1 case
„ 11th	.. ..	1 case	„ 26th .. .. 1 „
„ 13th	.. ..	5 cases	„ 27th .. .. 2 cases
„ 14th	.. ..	2 „	„ 29th .. .. 1 case
„ 16th	.. ..	3 „	„ 31st .. .. 1 „
„ 17th	.. ..	2 „	Aug. 1st .. .. 1 „
„ 19th	.. ..	2 „	

The age and sex distribution of the cases was as under:—

Year—	2–3	3–4	4–5	5–10	10–15	15–20	20–35	Over 35.	Total.
Male ..	—	1	—	6	1	2	—	—	10
Female ..	2	4	—	8	8	11	3	2	38
Total ..	2	5	—	14	9	13	3	2	48

Seventy-five per cent. of the total cases occurred between the ages of 5 to 20. The proportion of female cases is very striking—practically 80 per cent.

The figures for the period 10–20 years—three males and 19 females—rather tends to confirm the idea that whilst a young girl spends her odd coppers on sweets or ice-cream, the youth of the same age, before as well as after leaving school, spends his on cigarettes!

Incubation Period.

The incubation period was short, in the majority of cases apparently not exceeding ten days. An accurate figure was not possible in many of the cases—a considerable number were young children, whose information could not be relied on; further, many cases had eaten ice-cream frequently from the infecting source, and the true moment of infection could only be a matter of conjecture.

In 19 of the 48 cases the incubation period can be accepted as definite, and an analysis of these 19 cases gives the following result:—

Incubation period.	Cases.	Incubation period.	Cases.
5 days	3	10 days	1
6 „	5	11 „	4
7 „	3	12 „	1
8 „	1	18 „	1

Onset.

The onset was distinctly abrupt in character; most of the cases were compelled to take to bed within a day or two of their first symptoms. The abruptness, accompanied by a sequence of symptoms of which headache, lassitude, muscular or joint pains, shivering, and abdominal discomfort were the most prominent, accounts for the fact that many of the patients attributed their condition to either "influenza" or a "chill" on the bowel. The insidious onset usually associated with the enteric group of fevers was decidedly exceptional.

Type.

The type of disease was definitely mild; the period of pyrexia in many cases was not prolonged beyond ten days and the degree of constitutional disturbance was not very marked.

The 48 cases may be grouped as under in their degrees of severity:—

Severe attack	7 cases.
Average „	8 „
Mild „	33 „

Of the 7 cases grouped as severe 4 were in the age-group 15–20; one was 9 years of age, one 12 years, and one 26 years.

Symptoms and Signs.

The majority of these may be dealt with briefly in tabular form:—

Headache: Present in varying degree in practically every case.
Vomiting: In 18 cases.
Muscular pains: 12 cases.
Epistaxis: 13 cases.
Abdominal tumidity: 30 cases.
Diarrhœa and constipation were present in 22 and 18 cases respectively; in two instances definite slough was passed.
Lassitude: In 30 cases.
Shivering: 7 cases.
Abdominal pains: 25 cases.
Cough: 7 cases.

The following clinical notes are perhaps of special interest:—

The *abdominal reflexes* were studied in all patients; in the severer cases they were usually absent; late in these severe cases, and in those of a mild type, their presence or absence was extremely variable; one feels that too much stress must not be given to this side.

The *Diazo reaction* in the urine was carried out in all cases; in 26 of the 48 cases it was found to be positive.

Spleen.—Examination gave the following results: *Palpable* definitely in 18 cases, and in 6 of these appreciably tender to the patient. In several of the youngest children the enlargement was pronounced. Enlargement on *percussion* was noted in eight other cases, and *tenderness* only, on palpating the splenic region, was elicited in six cases. Therefore in 36 of the 48 cases some degree of splenic abnormality was detected. This may seem a high proportion, but, as pointed out earlier, most of these cases were seen prior to admission and at an earlier stage than is customary in hospital practice.

Rash.

In 37 of the 48 cases the rash was present. The rash varied in intensity from a few scattered spots to a succession of profuse crops. In many cases the typical spots were seen when the patients were visited in their own homes; this high proportion showing a rash inclines one strongly to the view that the rash of paratyphoid B fever is possibly present in all cases at some period during the course of the disease.

Wasting was quite appreciable in 20 cases, and in five of these it was severe.

Complications.

Hæmorrhage and perforation: Nil.

Thrombosis: Three cases—one of the left femoral and two of the right popliteal vein.

Boils occurred in two cases.

Relapses: Eight patients relapsed—in four of these cases the relapse commenced before the primary attack had terminated, in three within a week, and in one after an interval of a fortnight. The primary attack was severe in two of these cases, average in two, and mild in four. The relapse in all cases was mild in character. One of the cases with thrombosis developed this condition during the course of her relapse.

Treatment.—The cases were all treated on expectant lines and the dietary from the commencement was liberal.

Clinical and Laboratory Notes.

HYPERTROPHY OF THE TONSILS IN LYMPHATIC LEUKÆMIA.

BY F. STOKER, M.B. DURH., F.R.C.S. EDIN.,

SURGEON IN CHARGE OF THROAT AND EAR DEPARTMENT, QUEEN MARY'S HOSPITAL, AND THE ITALIAN HOSPITAL, LONDON.

Lymphatic leukæmia, though recognised as a cause of tonsillar hypertrophy, is not commonly given as such in the text-books. Yet the importance of appreciating this association is obvious, for the operative removal of leukæmic tonsils must lead to disappointment, or even to disaster. The following case may be looked upon as of the type likely to be referred to the surgeon, though the patient had attained a more advanced age than is usual in this disease.

A man, aged 55, was referred to the throat department of Queen Mary's Hospital for investigation of a possible cause of enlarged glands in both anterior triangles. He had lost weight, was sallow in complexion, but complained of no symptoms. The glands were only moderately enlarged, three masses as large as green almonds being in both anterior triangles. They were not hard nor in the least tender, were painless and freely movable. The soft palate and anterior pillars were of a dusky reddish hue, and the pillars were stretched over the tonsils. Both faucial and lingual tonsils were markedly hypertrophied; the hypertrophy was symmetrical and disposed in a lobulate fashion, particularly in the lingual area. The hypertrophied parts were yellowish-grey tinged with violet in colour, and looked friable, almost suggesting sarcoma to the cursory eye; on palpation they were firm and of the resiliency of quarter-inch rubber tubing. The pharyngeal and Eustachian tonsils were not involved, nor were any other lymphoid follicles in the mouth or throat.

A piece of the right tonsil was taken for microscopic examination, and Dr. Arthur Davies reported that "the outer lining membrane of the specimen consisted of stratified epithelium, the deepest layers of which were regular, and showed no tendency to transgress its normal limits. Subjacent to this epithelial lining was found lymphadenoid tissue occupied by masses of cells resembling leucocytes. The blood-supply was not abnormal. The usual picture of the tonsil germ centres was not as marked as was usual on account of the dense aggregations of small round cells. There was no evidence of a malignant process. A blood count might afford useful information."

Dr. J. Standish did a blood count and reported as follows: hæmoglobin, 85 per cent.; red cells, 4,320,000; colour-index, 1; total white cells, 168,000; polymorphs, 6 per cent.; eosinophils, 0; mononuclears, 2 per cent.; small lymphocytes, 92 per cent.

The diagnosis appears to rest on the absence of symptoms, the symmetrical hypertrophy and its appearance, the painless enlargement of freely movable and elastic glands, and particularly upon the blood count. I should like to take this opportunity of expressing my gratitude to Dr. Davies and to Dr. Standish, pathologists to the hospital, for the assistance given to me.

TWO FATAL CASES OF UNSUSPECTED RUPTURE OF THE SPLEEN.

BY F. WILSON, M.B. ABERD.,

ASSISTANT MEDICAL SUPERINTENDENT, CENTRAL MENTAL HOSPITAL, TANJONG RAMBUTAM, FEDERATED MALAY STATES.

IN the following cases rupture of the spleen occurred without producing definite signs of an abdominal accident:—

CASE 1.—A Chinese male epileptic, aged 17, had a series of seizures on June 23rd, 1926, and passed into status epilepticus. On examination his pulse was regular, 80 per minute, and with good tension. The spleen was palpable, about two fingers-breadth below the costal margin. No rigidity or tenderness on pressure was noted. An enema was given, followed by chloral and bromide per rectum. The seizures stopped, but the patient remained in a semi-conscious condition till the morning of June 26th, when he died.

At autopsy a considerable amount of faintly blood-stained fluid appeared when the peritoneum was opened. The spleen was soft, enlarged, weighed 20 oz., and showed malarial pigmentation. On the lower surface there was a rupture 2½ in. long and ¼ in. deep filled with a semi-organised blood clot which surrounded almost the whole spleen. There was marked congestion of all the organs.

CASE 2.—On August 24th, 1926, a Chinese male dement, aged 55, was admitted into the infirmary ward complaining of pain in the left hypochondrium. The history given was that a log had fallen on him while he was lifting firewood. He had a few abrasions on the lower extremities but no marks of injury on the abdomen. Nothing suggested an abdominal accident. Two days after admission all pain had disappeared; he was eating and sleeping well, and was allowed to move about.

On Sept. 2nd, nine days after admission, he again complained of pain, and was seen at 7 A.M. by the senior assistant physician who noted that the pulse was 100 per minute, but of quite good tension; the temperature was 98·4° F., and on palpation no tenderness, rigidity, or enlargement of the spleen was evident. The patient was seen afterwards by myself and another colleague. His pulse was then 110 per minute, but our examination confirmed the notes previously made. Nothing suggested an abdominal catastrophe, and the spleen was not palpable. The patient died quite suddenly at 11.30 A.M. on the same day.

Post-mortem Examination.—The spleen was enlarged, weighing 24 oz., but did not appear below the costal margin. On section numerous infarcts were seen of varying age. One recent infarct on the lower surface, about 2 in. in diameter, had ruptured, as also had the capsule over it. From this point a large semi-organised blood clot spread under the capsule for a short distance and surrounded the whole of the lower surface of the spleen. The peritoneal cavity contained a small amount of straw-coloured fluid but no trace of fluid blood was seen. Apart from the spleen, the only abnormalities noted post mortem were marked arteriosclerosis and amyloid degeneration of the liver, both probably of syphilitic origin.

In the first case the rupture probably occurred as the result of a fall in a seizure, and the presence of status epilepticus was not helpful to diagnosis. The general congestion of the organs suggested that a

more extensive hæmorrhage should have occurred and it is difficult to understand why it did not. The second case appears more remarkable. Osler mentions that rupture of the spleen may occur from the breaking of an infarct but adds that the symptoms are those of hæmorrhage into the abdomen. Here, however, there were no symptoms of hæmorrhage into the peritoneal cavity, and the patient lived for nine days after the injury. A further point in this case is that the spleen, though much enlarged, was not palpable below the costal margin. Where spleens are large and tempers uncertain, rupture of the spleen is not uncommon; but usually there are definite signs. These two cases illustrate difficulties which may arise and are instances of the treachery of abdominal complaints in mental patients.

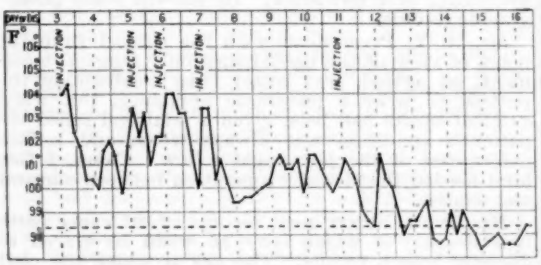
I am indebted to Dr. W. F. Samuels, the medical superintendent, for permission to publish these cases.

A CASE OF LOBAR PNEUMONIA
TREATED WITH OIL OF TURPENTINE.

BY J. CHRISTIE-ANDERSON, M.B. ABERD., L.D.S. R.C.S. ENG.

IN cases of pneumonia I have for some time been using a 10 per cent. pure oleaginous solution of rectified turpentine, prepared according to the formula of Prof. Viktor Klingmüller. The dose I have given is 1 to 3 c.cm. in adults, ½ c.cm. in children, intramuscular injection. In no case has there been any irritation or abscess-formation at the site of injection, but caution is necessary with this drug, as nephritis has been recorded after its use in children. The following is an illustrative case.

I was called to see a man aged 24, whom I found suffering from lobar pneumonia at the right lower lobe. It was the third day of the disease, there was rusty sputum, and the



temperature was 104·2° F. Within an hour I injected 1 c.cm. of the turpentine preparation and ordered the usual stimulants. The subsequent course of the disease is shown in the chart, which indicates the favourable influence of the injections (all of 1 c.cm.). The third was given at a time when the patient was very much distressed, and the effect appeared to be remarkable.

On the eighth day of the illness the crisis might be expected, and there was in fact a fall of temperature. But this was not maintained, and on the eleventh day I gave another injection with satisfactory results.

It will be seen that after each injection there was a marked remission of temperature; the drug seemed to relieve the distressing clinical manifestations enough to allow the patient to battle afresh. In a number of other cases, also in broncho-pneumonia and bad cases of bronchitis, I have had similar experience of the treatment.

RADCLIFFE INFIRMARY'S CONTRIBUTORY SCHEME.—Last year 60 per cent. of the total income of this Oxford hospital was provided by the Contributory Fund, which amounted to £27,000. The Fund covers a radius of 20 miles from the city, the membership is approximately 70,000, and there are 344 affiliated hospital committees. The out-patients' clinic for nervous disorders has been successful enough to warrant the closing of an entire ward in the Littlemore Mental Hospital.

Medical Societies.

ROYAL SOCIETY OF MEDICINE.

SECTION OF SURGERY.

AT a meeting of this Section, held on June 1st, the chair being occupied by Mr. V. WARREN LOW, its President, a discussion on the

TREATMENT OF CLEFT-PALATE BY OPERATION

was opened by Sir JAMES BERRY, President of the Society, and Mr. G. GREY TURNER (Newcastle-on-Tyne).

Sixteen years, said Sir James Berry, had elapsed since the Section had last debated this subject, and he invited all who had had experience of cleft-palate operations to relate their results. In the earlier debate discussion mainly turned on the comparative values of the turn-over flap and the lateral approximation of the edges of the cleft. In this comparison age was an important factor. Practically the sole object of operating on cleft-palate was to make possible intelligible speech; few if any surgeons now maintained that the operation was undertaken to save life. Yet it was true that an infant with cleft-palate, being unable to take the breast, might die of inanition, although swallowing was not interfered with by the cleft. Such an infant should first be carefully fed; there should be no thought of immediate operation which entailed risk from loss of blood and possible sepsis. A certain proportion of clefts were very narrow and affected only the soft palate or a part of it; they could often be closed by lateral approximation within a few weeks of birth if so desired. With most clefts, however, this was impossible on account of the width of the gap and the lowness of the palatine arch. There was a tendency for a cleft of the soft palate, wide at birth, gradually to become narrower; this sometimes happened even if the cleft extended to the hard palate. Closure was more rapid when the accompanying hare-lip had been dealt with, as it always should be, within the first few months of life. If an operation was imperative in early infancy for extensive cleft it must be by the turn-over method. The use of wire for forcibly approximating the jaw bones was open to serious objection.

Operation should be undertaken, Sir James Berry continued, at the earliest age which gave a chance, in the surgeon's own experience, of closing the cleft by lateral approximation. His own choice was between 1½ and 4 years of age. A surgeon with less experience would do well to wait until a much later age in the patient's life. Otherwise there was a risk of leaving the palate in a condition which offered less chance of completely remedying the defect later owing to scarring and loss of tissue. Since the earlier debate on the subject he had himself in a number of cases attempted closure at an earlier age than was his former custom, but he was not pleased with the venture, for part of the hard palate had remained unclosed, needing a further operation. Not much was gained, he thought, by closing the soft palate at an early age and leaving the hard palate to be dealt with at a later period, when the presence of scar tissue rendered it more difficult to separate the soft tissues from the posterior edge of the bony palate. The most difficult cases, he had found, were those in which the cleft was very wide and involved the soft and most of the hard palate, and in these he elected to close the cleft in the soft palate first, leaving the hard palate for a time. It was often better to leave the anterior end of the cleft unclosed rather than endanger the vitality of the flaps by severing the anterior palatine artery. The small hole remaining might close spontaneously, or require at most a small subsequent operation. Greatest importance attached to closure of the soft palate; a patient was but little benefited if the rent in the hard palate was closed and that in the soft palate remained open. No obturator was as good as a well-restored soft palate.

Lateral approximation, said Sir James Berry, was the method most surgeons now employed, though there was a good deal of difference of opinion concerning it. His own impressions were based upon an experience of 33 years, during which time he had operated on 276 cleft-palates. A precedent to the operation should be the removal of gross defects of teeth and tonsils, not necessarily a routine excision of tonsils and adenoids. Nor was it needful to attempt asepsis of the mouth some days before operating. The general health of the child must be good and nasal catarrh must first be cured. The posture he preferred to adopt when doing these operations was to stand on the right side of the patient facing the head, which was thrown well back with shoulders raised, so that the blood ran into the upper part of the pharynx, not into the larynx. The disadvantage of this posture was occasional faintness, but the bleeding was less than in any other posture. Smith's gag was to be preferred if the assistant had been trained in the holding of it.

On two points, Sir James Berry said, he would like to hear the opinion of others. The first was the extent to which the soft tissues should be separated from the bony palate. Unless the separation were thorough the soft palate, even if that alone were affected, could not be brought down sufficiently for the pared edges to be pulled together without tension, and tension meant failure of union. The separation was best brought about, in his opinion, from inside the cleft, avoiding the vicinity of the posterior palatine artery. The nasal intonation characteristic of cleft-palate speech was caused by abnormal air entry into the nose, which in normal people was avoided by raising the soft palate and by lateral approximation of the palato-pharyngeal muscles. The second point was the need of making lateral incisions to relieve tension. With wide and difficult clefts such incisions were frequently essential, on one side or both, but seldom should they exceed half an inch in length, unless for secondary operations for large holes in the hard palate. Of recent years his practice had been to employ these incisions less and less, replacing them by deep-tension stitches and rubber plates, after the manner of Brophy. Stout fishing gut tended to cut out; he had tried putting short pieces of rubber tubing on the suture, but they buckled and caused ulceration. Eventually he had found satisfaction in flat oval discs of sheet rubber threaded on stout fishing gut. They did not increase the liability to sepsis if removed on the fifth day, by which time union should be strong enough to stand the strain imposed by the palatine muscles. They would be useless for the thinner tissues of the hard palate. He had had no experience of the very long lateral incisions; he thought they must damage unduly the palatine and pharyngeal muscles.

The less after-treatment the better the result. For at least a week the diet must be confined to milk or milk and water; no washing, wiping, or spraying of the mouth was allowed, apart from a drink of warm water after each feed. The child should be kept in the fresh air as far as possible. He did not examine the palate until four days after the operation, and decided then how soon the plates should be removed.

Mr. GREY TURNER spoke from an experience of 155 cases of cleft-palate, upon whom 195 operations had been done with four deaths. The average age at operation of the children under 12 was 4 4/12 years, and of those over 12 was 18 9/12 years. The oldest was 40. He had been able to examine 79 of these cases 1–24 years after operation and to estimate the functional result in 90. These he classed as: very good or normal, 10; good, 35; fair or moderate, 25; bad or poor, 17; unintelligible, 3. In 11 cases operations had previously been performed by other surgeons. Failure of union occurred only once. In 44 cases in which the palate was completely restored anatomically speech was normal in 7 cases, good in 20, fair in 14, bad in 3. In 12 the operation was still too recent to assess the result. To ensure success from the speech standpoint the patient should be left with a good soft palate, and if possible one which was sensitive. The varying result was, he thought, connected with the architecture of the nasopharynx and with the neuromuscular apparatus. Integrity of the sphincter just behind the soft palate had much to do with perfect speech. He did not hesitate himself to operate on soft palates within the first year of life and to allow the infant to return home. A lateral incision, though often necessary, was not an essential part of the operation. Tension must be avoided at any cost. Suture material should be of a sort which did not absorb the secretions of the mouth; he now used chromicised catgut. In certain cases much could be accomplished by a secondary operation; he had operated four times on one patient. He would like to know how holes in the palate could be avoided. In regard to hare-lip, he had found that large anterior nares facilitated the escape of air through the nose, and might interfere with a good functional result.

Discussion.

Mr. O. L. ADDISON condemned the flap operation. He did not think there was any advantage in operating before the age of learning to talk; the older the patient when operated upon the more likely were anatomically good results to ensue. He preferred the long lateral incision to avoid tension. Before touching the palate he always removed the tonsils, which he regarded as a source of potential sepsis. All his patients were Dick tested beforehand, and if positive received a dose of serum. Of his 77 cases two died, one from reactionary hæmorrhage the night following operation, the other from convulsions under the anæsthetic.

Dr. VICTOR VEAU (Paris) said he had operated upon 89 children's palates by the Langenbeck method, and in 74 there was total closure, in 13 imperfect closure, in 3 the operation was a total failure; 25 per cent. of the patients spoke well after the operation. He described his present procedure, which consisted in turning up a flap from the vomer and carefully suturing the mucous membrane, thus preventing scar formation. He showed some phonographic records.

Mr. A. T. PITTS dealt with the subject from the point of view of the dental surgeon. Surgical treatment, he agreed, was better than condemning the patient to wear a prosthetic appliance, but when surgical efforts had been given a trial and failed the patient's condition was always worse and serious deformities of the jaw might follow. Cases of this kind needed the closest coöperation between surgeon and dentist.

Mr. CYRIL NITCH gave records of 86 cases (with four deaths) of which only 43 could be traced to discover speech results. The age at which the cleft should be closed depended, he thought, on the type of operation done. The flap operation of Lane should be performed about four months before the teeth were developed. He had not, however, performed that operation since 1913, for though the cleft could be closed with certainty, the soft palate was always short and rigid, and the speech correspondingly bad. The age he generally selected for operation was from 18 months to 2 years. He always tried to close the whole cleft at one operation, provided the anterior palatine arch could be preserved. He made long lateral incisions at the posterior border close to the alveolus, curving outwards and downwards towards the last lower molar tooth. The mother should be taught to massage the soft palate after operation. Since he had adopted Langenbeck's operation with long tension-relieving incisions and lateral splints his failures had been reduced to 17 per cent., as compared with 50 per cent. with the unmodified Langenbeck.

Mr. CORTLANDT MACMAHON spoke of the speech-training of these patients. The difficulty was with the letters *k*, *g*, *d*, and *t*, but especially the letter *s*. The letter *s* could be restored in the speech of these patients by driving the tongue down so as to produce tension between the soft palate and the back of the tongue. He believed that under training the Lane operation would give good speech, but if the training

was deficient the Langenbeck method gave the better result.

Mr. H. D. GILLIES made some remarks on secondary operations. The great majority of cases, he said, would be vastly improved by severing the soft from the hard palate, making provision for an epithelial covering of all raw areas, interposing an appliance between the soft and the hard palate, and allowing the soft palate to assist in shutting off the nasal from the buccal cavity.

Mr. C. H. FAGGE said that up to the end of 1924 he had operated 218 times on 114 cleft-palate patients; some of these operations were on the lips, others for closure of holes in the palate. On the largest group of cases, those of complete unilateral cleft, he first performed a Lane's flap operation on the hard palate, then a hare-lip operation, and finally closed the soft palate at a second sitting. He had never failed to close a hard palate with a Lane's flap, nor had he seen one break down. Lane's operation did not make the operation on the soft palate any more difficult. He had an impression that whenever he could close both the hard palate and the soft before the first dentition commenced he would obtain a good anatomical result. With the Langenbeck operation pure and simple he had had about 60 per cent. of successes and 5 per cent. of complete failures; with the combined operation 62 per cent. of successes and no complete failures; and with the complete Lane operation 33 per cent. of successes and a good many failures. In performing the Langenbeck operation he made use of a very long incision on either side, dividing the anterior pillar of the fauces, after which the two surfaces of the palate were sutured in the middle line with very fine fishing gut. The one thing he feared was tension.

Mr. KELSEY FRY, speaking as a dental surgeon, said that if surgeons would provide for the cleft-palate patient a functional soft palate it would be an easy matter for the dentist to provide a hard palate.

Mr. F. W. GOYDER (Bradford) said he operated fairly late, rarely on patients under 3 years, following Langenbeck's method except when the clefts were very wide. In his last 22 cases he had used a flap in 11 and the median operation in the other 11. Even when doing the Langenbeck operation he used narrow flaps and united them so as to leave no raw surface.

Mr. L. E. BARRINGTON-WARD said he had operated on 148 patients, with six failures. One of these was a horseshoe cleft, which was usually the most difficult, three had deficiencies in hard or soft palate, and in two the alveolus was still cleft. Recent speech-testing in 58 of these patients gave 20 good results, 18 fair, and 20 bad; among the bad were four mentally deficient. If a hare-lip was associated with the deformity the operation should take place as early as possible; his usual rule was to do it at 1 month. The palate itself he preferred to do at 18 months or 2 years, or even later. He did Langenbeck's (which he thought posterity would call Berry's) operation, lateral approximation to median suture, using the finest ophthalmic silkworm-gut. He believed that relaxation sutures nearly always cut out or produced ulceration. With regard to prognosis in the matter of speech he would be guided not so much by the type of cleft as by the intelligence of the mother.

Mr. TWISTINGTON HIGGINS said he had operated on 47 cases since 1921, using the modification of Gillies—a relatively easy procedure—the only difficulty being the epithelial graft with which it was necessary to cover the raw area. He had also adopted Mr. Addison's technique in 15 cases, removing the tonsils previous to operation, for they were often infected without external sign to show it.

The PRESIDENT, in summing up the discussion, said that he had been struck by the extraordinarily hopeful outlook there was now for the child born with cleft-palate. He was sorry that not more had been heard about the Brophy operation.

Sir JAMES BERRY and Mr. GREY TURNER briefly replied.

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES.

A MEETING of this Society took place on May 27th, Sir HUMPHRY ROLLESTON, the President, in the chair.

Dr. GEORGE RIDDOCH read a paper on the

PROGNOSIS AND TREATMENT OF NEUROSYPHILIS.

The localisation of the virus to the nervous system, he said, was never more than relative; the functions of the other organs might be deranged, or those of the body as a whole might be impaired by the spirochæte. The defensive reaction of the patient to the invading parasite must be considered, and differences in the severity of tabes in different people were not due merely to differences in the strength of the virus.

Two important questions arose: (1) Could the disease be arrested? (2) If so, how much disability would be left? Probably there was no natural immunity to the disease, but the history of syphilis showed that considerable inherited resistance was present. In estimating the prognosis in any particular case the patient's power to combat the infection was very important. It would be influenced, moreover, by such non-specific factors as nephritis, diabetes, urinary sepsis secondary to paralysis of the bladder, or by faulty habits such as abuse of alcohol. Another important point was the duration of the disease and of its nervous manifestations. Early diagnosis was very necessary, for obviously a patient whose tabes was detected when there were but few physical signs was a better subject than one who already had multiple and extensive lesions in the nervous system. The same held true in cerebral syphilis.

Meningovascular syphilis was more amenable to treatment than the parenchymatous forms, because it was difficult for drugs circulating in the blood stream to reach organisms in nerve tissue. When definite mental symptoms, such as dementia and delusions, occurred in cerebral syphilis it was evident that encephalitis was present, and the state of affairs was very difficult to deal with; there was less chance of making the patient a "good life" than if the disease had been caught earlier. Epilepsy as a sequel of cerebral syphilis indicated encephalitis of a serious kind. Optic neuritis had a similar significance, but cranial nerve palsies might be due to involvement of a nerve in its extracranial course, rather than to an active arterial lesion, and this did not imply so serious an outlook. In spinal syphilis there was, of course, a better chance of eradicating the disease if the infection had not caused severe paraplegia with its probable disturbance of the bladder. It was always necessary to bear in mind the tendency of neurosyphilis to undergo remission and relapse, even after treatment had made the laboratory tests negative. It might be said that with efficient treatment tabes could be arrested in half the cases, but this did not by any means imply that treatment should be discontinued after the arrest. Tabes was now seen earlier at neurological clinics, and it was rare to see patients who on their first application were grossly ataxic or nearly blind. For this improved state of affairs he thought the general practitioner was largely responsible.

General paralysis of the insane, continued Dr. Riddoch, was a much more discouraging condition, and before malarial treatment was instituted the outlook had been almost desperate, death being rarely deferred for more than two or three years. Malaria gave ground for hope, though its value could not yet be assessed.

There was a group of cases of what could be described as occult neurosyphilis. There was a danger of confusing this condition with ordinary neurasthenia, because it was accompanied by lassitude, defective concentration, and emotional instability; or it might be wrongly attributed to alcoholic indulgence. Probably the symptoms were mostly due to a mild meningoencephalitis rather than to gross

parenchymatous changes. Even the pathologist could not always determine whether a patient had syphilitic neurasthenia or early general paralysis of the insane, as the blood might be Wassermann-positive, while the cerebro-spinal fluid was unchanged. It was unwise to lay too much stress on laboratory tests and they must be related to the patient's general state. It would be a great mistake to assume that a negative Wassermann reaction following a positive one meant that the patient had got rid of his infection, for it might again become positive, either with or without treatment. It was important to know how a patient had dealt with his early infection, as this helped to indicate the degree to which he would combat the later manifestations. If early treatment had been thorough the later development was of more serious significance. A patient should be told that he might become worse before the treatment had its full effect.

Treatment.

The general principle to be kept in mind in treatment, said Dr. Riddoch, was that antisyphilitic remedies were only an aid to the natural resistance of the body; if used injudiciously they were poisonous to the tissues. How could the natural resistance be kept at its highest level? A quiet, healthy life was necessary, with adequate rest and attention to diet. In the tabetic the relief of pain was of considerable importance. Amongst things forbidden should be excessive indulgence in tobacco and alcohol and excessive sexual intercourse, whilst in women pregnancy should be discouraged. It was important to maintain the morale of these patients so that they would persist with treatment. Massage and exercises might be needed. Séquard advised daily small doses of salvarsan, either subcutaneously or intravenously, up to 60 injections, without mercury or iodide of potassium. In most cases under this treatment the ankle-jerks disappeared after six to ten injections, and Dr. Riddoch looked upon this as an indication of active poisoning of peripheral nerves due to administration of the drug being unduly pushed. Some advised a preliminary course of mercury before using arsenical preparations, and he believed that salvarsan used alone was less effective than when combined with mercury or bismuth, iodide of potassium being given in all forms of neurosyphilis except general paralysis of the insane. He had not found that silver salvarsan gave better results than novarsenobenzol, with potassium iodide by the mouth. Tryparsamide had been reported on favourably from the Rockefeller Institute, but he did not think it could yet be said whether it was better than the ordinary arsenical preparations, of which novarsenobillon was the one most used in this country, its capacity being well known and its toxicity controlled. He could not say much in favour of salvarsanised serum; indeed, he had seen aggravation of root-lesions follow its use. He did not think any patient should be treated continuously simply because his Wassermann was positive.

To be suitable for malarial treatment a case of general paralysis of the insane should be taken early and should be free from cardiovascular and renal disease. A patient whose brain had been partially destroyed, with consequent dementia, might recover sufficiently to enable him to do work which did not exact much from him. Whilst infected by malaria the patient might exhibit an acute psychosis, or even become maniacal; but he would probably reach his previous mental state on recovering from the malaria.

After vascular and parenchymatous lesions, said Dr. Riddoch in conclusion, some permanent damage always followed. The main indication of the efficacy or otherwise of treatment must be the clinical findings, though help was obtainable from laboratory tests. It was very important not to push antisyphilitic remedies unduly, and it was necessary to keep careful watch for signs that the limit of the patient's tolerance had been reached.

Discussion.

The PRESIDENT spoke of the possible relationship which amyotrophic lateral sclerosis and disseminated sclerosis might bear to syphilis. He asked whether it was the general view that syphilitic hemiplegia due to arterial disease was now rarer than formerly. Was the diminishing frequency of tabes due to earlier and more thorough treatment of syphilis, or was it likely to be due to some special organotropic strain of the spirochæte? He was reminded of cases described by Erb in which patients given vigorous mercurial treatment had developed what appeared to be tabes, but was in reality polyneuritis. There was no doubt that tabes and general paralysis were never cured. Referring to the treatment of general paralysis by malaria, he mentioned some fatal cases in Dublin in which the patients had been given the malignant tertian infection. With benign tertian malaria there seemed little risk of harm.

Colonel L. W. HARRISON did not agree with Dr. Riddoch's criticism of silver salvarsan; he thought it caused more improvement than any other arsenical preparation. He preferred to use it by the deep subcutaneous method. After a patient with general paralysis had been treated with malaria, the cerebro-spinal fluid should not be examined until three months after the malarial paroxysms had ceased. His view was that bismuth was a much more valuable drug in the treatment of neurosyphilis than mercury, especially when it was given together with large doses of potassium iodide.

Dr. C. P. SYMONDS remarked that the difficulty in assessing the value of any treatment of neurosyphilis lay in the fact that most people had comparatively little experience of the course of the untreated disease. From observing cases which had not come for treatment until a late stage he concluded that, apart from syphilitic encephalitis, neurosyphilis was a self-limited disease. He had found novarsenobenzol more valuable than mercury in neurosyphilis, and it was important to push remedies to the patient's point of toleration. Even if some cases showed jaundice the price was justified in the amelioration of the syphilis. In meningeal forms iodide was a very valuable drug. He agreed with Dr. Riddoch that treatment should be determined by the clinical condition rather than by the serological reactions. There seemed no doubt that in a proportion of cases the life of a general paralytic would be prolonged by several years by inducing an attack of malaria. In parenchymatous neurosyphilis it was hard to give a prognosis; in tabes he did not think it was safe to promise anything.

Dr. H. M. HANSCHELL related the course of events in 12 cases of general paralysis of the insane which he had treated with malaria. In three cases of tabes similarly treated the Wassermann reaction was negative in the cerebro-spinal fluid three months after the malaria was cured.

Mr. WANSEY BAYLY described a case in which a dramatic apparent cure of general paralysis followed a course of malaria.

Dr. W. D. NICOL spoke of experience of the treatment at Horton Mental Hospital. Many patients with general paralysis of the insane had improved greatly. The paranoid patients reacted worst.

Dr. S. C. WOODHOUSE spoke of the blood and cerebro-spinal fluid picture in cases of tabes, and Dr. J. G. GREENFIELD referred to the inflammatory reaction in the brain after malarial treatment.

Dr. SHARPE and Mr. C. H. MILLS also joined in the discussion.

EDINBURGH MEDICO-CHIRURGICAL SOCIETY.

AT a meeting of this Society held on May 4th Dr. A. NINIAN BRUCE read a paper on the

Treatment of Locomotor Ataxia

with special reference to the ataxia. Locomotor ataxia or tabes dorsalis was, he said, first clearly defined as a separate clinical entity by Duchenne, of Boulogne,

in 1841–51, and much speculation and controversy took place before it was established that it was due to a syphilitic infection of the nervous system. It is now known that the lesion affects the posterior sensory nerve-roots, and that the optic nerve is also liable to be involved. As the spirochæte limits its attack so largely to the sensory fibres, the resulting symptoms tend to be purely sensory, and it is thus important to realise that apart from impulses of pain, touch, heat, and cold which pass centralwards by this pathway and reach consciousness, a very large group of sensory impulses also utilise this pathway but remain at the physiological level, and thus do not enter consciousness; they are concerned with the maintenance of posture and equilibrium and such fibres arise from the tendons, muscles, and joints.

Apart from blindness, said Dr. Bruce, ataxia is the most serious symptom from which a tabetic may suffer as it deprives him of his power of locomotion; it is also a symptom which tends to progress and ultimately leaves the patient in a bed-ridden state. In fact, tabes is often divided into three stages: (1) the pre-ataxic, (2) the ataxic, and (3) the paralytic, depending entirely upon the progress of the ataxia. It is interesting to note that many observers have drawn attention to the fact that a tabetic who is blind is not ataxic, and that the development of blindness in an ataxic man usually results in the disappearance of his ataxia. Tabes is not a lethal disease and does not necessarily affect the average duration of life to any great extent. Involvement of the posterior sensory root in tabes results in an interference with postural information passing centralwards and thus leads to a disturbance of reflex action. This delay and diminution of postural stimuli creates confusion in the pathways of nervous integration and the information reaching the end-stations is misleading. Endeavour is then made to counteract the errors by vision, and information of posture is obtained through the visual pathway. This, however, is a much more complicated mechanism than the one based on purely postural images which has been thrown out of gear. The replacement of a physiological mechanism by a more complicated one involving consciousness is inefficient and leads to fatigue. At the same time the misleading postural images are repressed and the new visual mechanism, becoming more and more complex and fatigued, leads to muscular incoördination and ataxia. This inexplicable symptom rapidly progresses; the more the ataxic tries to walk, the worse he becomes. Mental demoralisation and chaos set in, he surrenders to what he regards as the inevitable, and is usually stated now to have reached the paralytic stage. Walking was originally learned from visual images, and it is only later when postural images are established that visual images are discarded. A good pianist keeps his eyes fixed on the music, the fingers wandering up and down the keyboard controlled only by postural images.

The treatment of ataxia, went on Dr. Bruce, consists in relearning the use of postural images; visual images may require to be cut out by blindfolding the patient. That postural images may be cultivated to a high degree is shown by acrobats and tightrope walkers. They are best relearned by first creeping until this can be done with ease, and then kneeling and walking on the knees. When this is learned it may be followed by standing supported and unsupported, by various muscular movements and exercises, and finally by walking, by going up and down stairs, and by all the other muscular movements required in daily life. The mental relief obtained is enormous. A pre-ataxic case, properly handled, need never become ataxic. To a large extent, therefore, the proper treatment of tabes really closely resembles that of syphilitic neurasthenia, and the disease itself may be more correctly regarded as syphilitic neuritis of the posterior roots. The condition illustrates well the fact that organic disease may produce functional nervous symptoms, which, when once developed, may steadily progress, although the organic lesion itself may remain more or less stationary.

Reviews and Notices of Books.

MODERN MEDICINE.

Its Theory and Practice. In Original Contributions by American and Foreign Authors. Edited by Sir WILLIAM OSLER. Third edition. Thoroughly revised and re-edited by THOMAS MCCRAE, M.D., assisted by ELMER H. FUNK, M.D. Vol. IV., *Diseases of the Respiratory System; Diseases of the Circulatory System.* London: Henry Kimpton. 1927. Pp. 1011. In sets of six volumes only. £12 12*s*.

THE publication of a third edition of this well-known system of medicine is a sign of its established reputation. It is a sign, too, of the rapidly changing times which make even works of reference quickly out of date. This fourth volume on diseases of the respiratory and circulatory systems covers a thousand pages, and does not include chapters on lobar pneumonia and pulmonary tuberculosis, which very properly are treated in another volume. A standard work of medicine, the authors of which must plod solidly through the systems, can hardly be expected to attain to the same level of excellence throughout. This volume is no exception. The section on bronchiectasis, for example, is disappointing, even when allowance is made for the obstinacy of this particular task. The bacteriological aspect of bronchiectasis and the clinical classification are dealt with too briefly, whilst the value of the radiogram, of lipiodol, and of the newer surgical operations receives no special mention. At the beginning of the section on respiratory diseases there is a useful summary of the physiology of respiration which serves as a good introduction to the first part of the book. The phenomena of cyanosis are not all specified here, though the admirable work of Lunsgaard and Van Slyke on this subject is adequately discussed under congenital cardiac disease. In a subsequent edition a short section on the clinical examination of the normal chest in the light of what modern radiography has taught us might well be inserted. The chapter on the phenomenon of hypersensitiveness including protein sensitisation, hay-fever, and asthma, is a good exposition of a subject which must have been difficult to condense into 30 odd pages.

The second part of the book on diseases of the circulatory system contains two quite brilliant chapters. The first of these is on the rate and mechanism of the heart-beat by Sir Thomas Lewis, and the other on congenital cardiac disease by Dr. Maude E. Abbott. The former is a full and lucid account of a subject which gives much anxiety to the practitioner. It is not overburdened with the technicalities of the electrocardiograph or with baffling formulæ and diagrams, but is clearly and simply written. It contains, furthermore, a helpful summary of the new work on quinidine. The chapter on congenital cardiac disease occupies one-fifth of the whole book and is not a page too long. It is indeed a really excellent monograph on the subject, one which goes far to make Vol. IV. of this system of medicine a standard work. A general survey of the plan of the volume leads one to the conclusion that the pathology in most sections is condensed into almost too small a space, notably in matters bacteriological. Treatment, moreover, looms none too large, and this is dangerous in so far as the student is only too ready to believe that diagnosis is the end and aim of the physician. This last criticism might be applied to many modern text-books of medicine—a sign of a transition period which marks the passing of the art of symptomatic healing and the birth of the science of accurate differential diagnosis with its accessory instruments and laboratories. The borderline where treatment becomes surgical especially deserves fuller discussion than is here given. Nowadays the physician must be sufficiently conversant with surgical procedure and practice to coöperate intelligently with the surgeon.

In general this fourth volume can be confidently recommended as a good summary of modern medicine

in the particular subjects with which it deals, and we look forward to the completion of a work on which many students and practitioners have learnt to rely. A last word may be a plea for a stronger binding for a reference book which will so often be taken from the shelf.

MANUAL OF MEDICINE.

Third edition. By A. S. WOODWARK, C.M.G., C.B.E., M.D., F.R.C.P., Physician, Lecturer on Medicine, and Dean of the Medical School, Westminster Hospital. London: Humphrey Milford, Oxford University Press. 1927. Pp. 513. 15*s*.

SINCE the second edition of this well-known manual was published in 1920 various advances in medicine have necessitated alterations and additions to the text; but the size of the book remains substantially the same and it can still claim to be a "manual." In the section on the liver van den Bergh's test is described, but catarrhal jaundice is still left under the misleading heading of "gross obstruction of the common bile-duct." Cholecystography is mentioned in the diagnosis of gall-stones; according to many observers, the oral method is not so unsatisfactory as is here implied. The use of lipiodol in the diagnosis of bronchiectasis is described, and insulin treatment is well discussed in the section on diabetes. A good account of the pathogenesis of asthma is given, without undue emphasis upon protein hypersensitiveness. Some portions of the section on the heart are disappointing; no mention is made of "circus movement" in the pathology of auricular flutter and fibrillation, and quinidine is too valuable and interesting a drug to be dismissed as "gr. v., t.d.s." Apart from these small points the book shows signs of careful revision, and remains an excellent guide to medicine.

SURGERY.

Manual of Operative Surgery. Sixth edition. By Sir HOLBURT WARING, M.S., B.Sc., F.R.C.S., Surgeon to St. Bartholomew's Hospital; Examiner in Surgery, University of Oxford. London: Humphrey Milford, Oxford University Press. 1927. Pp. 868. 18*s*.

Sir Holburt Waring has thoroughly revised this latest edition of his work. Its good reputation should be further enhanced by improvements and additions, and by the deletion of accounts of obsolete methods. It is a really good practical text-book of operative surgery; the author has made it more than a compilation by drawing upon his long experience to advise on the choice of operation and to comment on the results he has found to follow the different procedures. We see how his process of selection has taken place, for instance, in the section upon cleft-palate, where all reference to the Davies-Colley operation has been omitted, a decision with which most surgeons will agree. On the other hand, implantation of the ureters into the rectum in ectopia vesicæ can give brilliant results and is worth consideration in a book of this kind. It is interesting to note that the author favours a somewhat lateral intracranial approach to the pituitary body.

The diagrams illustrating lymphatic drainage and the principles upon which malignant surgery of the different organs should be carried out are particularly helpful in this edition. There is also a useful description of general surgical technique and theatre appliances, to which the author has devoted considerable attention.

Surgical Applied Anatomy. Eighth edition. By Sir FREDERICK TREVES. Revised by C. C. CHOYCE, B.Sc., M.D. Edin., M.B., F.R.C.S., Professor of Surgery in the University of London; Surgeon to University College Hospital. London: Cassell and Co., Ltd. 1926. Pp. 727. 14*s*.

THIS classical manual on surgical anatomy has been thoroughly revised and brought up to date by Prof. C. C. Choyce. It has been deservedly popular in the past, and is likely to become more so in the future. It will be particularly acceptable to the senior student, since it combines the outlook of an anatomist and the views of a surgeon. It is complete and exact in its statements, full of really useful diagrams, easy to read, and contains the kind of information which is often very difficult to find. The book is, perhaps, a little long for the ordinary student to read right through, but it is not easy to see how any portions or even paragraphs could have been omitted. It is one of the best treatises on surgical anatomy available to English students.

FOOD VALUES.

For Calculating Diabetic and Nephritic Diets. Calculated from Bulletin No. 28, U.S.A. Department of Agriculture. By LOUISE M. KEEGAN, University of Chicago Dietitian, Polyclinic Hospital, New York City. New York: The Macmillan Company. 1926. Pp. 106. 7*s*.

Food Values and Recipes for Diebetics. Second edition. By S. MILLER, M.D., and F. B. SMITH, M.D. Belfast: R. R. Browne and Co. 1926. Pp. 23. 2*s*. 6*d*.

THE composition of foods, though such an important branch of medical science, is little studied in this country in comparison with Canada and the United States of America. The most complete publication on the subject is Bulletin No. 28 of the U.S.A. Department of Agriculture, for which Attwater and Briant are responsible; practically all the books of food values which have been published are based on their figures. The information in the Bulletin is so voluminous that it is necessary to issue some sort of abridged version—for example, that no less than 57 portions of beef are analysed is quite sufficient to confuse the ordinary person, especially as he is unlikely to be able to identify the joints referred to. Miss Keegan has considerately reduced the portions of beef to 20. The protein content of these varies from 14 to 24 g. per 100 g. of meat (average value 18 g.). The fat varies from 3 to 28 g. per 100 g. (average 16 g.). Even for the abridged tables considerable knowledge of the different joints of meat is required. If it is necessary to record the exact amount of protein and fat in the diet, very accurate tables of this type are essential. In most of the big hospitals in Canada and U.S.A. a special kitchen is established with one or more skilled dietitians in charge; it is thus possible to ensure the control within narrow limits of the number of grammes of protein, fat, and carbohydrate consumed by any patient. Miss Keegan's tables are well adapted to serve this end; it is possible with their help to give to patients in hospital much variety without altering the essential composition of their diet by more than a few grammes. Whether the patients who have left hospital will even after careful training have the ability or indeed the knowledge or the time to worry over the difference between a sirloin of beef and a porter-house steak is another matter.

The tables prepared by Dr. Miller and Dr. Smith are suitable for a very different type of patient. Thus in one table the food values of beef, lamb, mutton, pork, and veal are all classed as identical, though in the full tables three kinds of beef are given, one of lamb, two of mutton—all varying slightly from the group figure. For the skilled dietitian these tables are valueless, but for the average diabetic patient in England they should suffice, though it would be of assistance if the caloric values were also given. Incidentally nearly all the English tables omit this information, which is supplied in American tables as a routine. Dr. Miller and Dr. Smith have given all their food values in terms of 1 oz. This form of notation is convenient, but does not make substitutions so easy as the alternative scheme, first put forward by Dr. O. Leyton, of giving the weights of the different foods which contain 5 g. of carbohydrate. It is, for example, easy to substitute raspberries for grapes without doing any of those calculations which many patients are incapable of grasping. In a future

edition this notation should be adopted by Dr. Miller and Dr. Smith, since the intelligence of patients varies greatly, and many elderly women are incapable of doing even division sums without much trouble. In other respects patients will find the tables easy to follow, while the recipes given will be most useful to those whose diets have to be strictly controlled.

To those who are sceptical of the need for such detailed instructions we would point out that in the future even the most hardy among us may be encouraged to choose his meals on this plan; in certain restaurants in New York already the caloric values of the different dishes on the menu are set out so that the hungry man can know which gives the best food value.

THE SHIP-SURGEON'S HANDBOOK.

Third edition. By A. VAVASOUR ELDER, D.S.C., M.R.C.S., L.R.C.P., Surgeon Lieut.-Commander, R.N.V.R. London: Baillière, Tindall and Cox. 1927. Pp. 523. 10*s.* 6*d.*

THIS book will prove of great value to doctors going to sea for the first time in medical charge; it will keep them out of many difficulties, professional and social. They will find it easier to use a microscope on board than the author allows; indeed, a microscope must be carried on some foreign liners for the diagnosis of malaria, plague, and typhoid fever. Much helpful detail is given for managing a case of sea-sickness, though the treatment advocated in the closing summary is frankly expectant. Good advice will be found here for practitioners who wish to send their patients for voyages, due regard being paid to the diseases from which these are suffering or recovering, and to the voyages appropriate to each season. The author holds that doubtful cases of pulmonary tubercle may be sent on short voyages, that early cases do better in sanatoriums, and that there is no place for advanced cases on board ships owing to the great risk of hæmoptysis. The chief anxiety of ship-surgeons at the moment seems to centre round the immigration officer, who is only to be disarmed by frankness and accurate papers. The author has good words to say even for Ellis Island, and suggests that the minute examination of British seamen at New York, of which so much was heard a year ago, was initiated because so many seamen were deserting and so many fraudulent and unfit immigrants were being clandestinely received into the United States. A striking paragraph (p. 411) describes anew the old seafaring disease, of which we have heard no mention for years, called calenture. The sufferer from calenture has the temporary delusion that the sea is a green field, full of flowers so clearly seen that the patient may even go overboard to pick them.

INTERNATIONALE RADIOTHERAPIE.

By Dr. J. WETTERER. Darmstadt: L. C. Wittich. 1925–26. Band I. Pp. 1056.

THE author has set himself the task of bringing into a single volume abstracts of the international literature on radiotherapy for 1925–26, and further volumes are projected if his labours meet with an adequate response. Those who are in touch with the present position of radiological treatment and its developments are aware of the need for such a book, the subject being one which can hardly be covered at the present moment by any text-book.

Dr. Wetterer's abstracts have been fully and conscientiously made. The details of technique and statistics of results have been carefully given without undue condensation, and his work is thus most valuable for reference. Dr. Wetterer deserves praise for the enthusiasm which has enabled him to carry out so vast a task. We would suggest in future editions the index of authors should include their initials. It may be hoped that English radiologists will coöperate to the utmost with Dr. Wetterer in supplying him with published material, as he is endeavouring to make the volume in the fullest sense international.

A TEXT-BOOK OF EMBRYOLOGY.

By H. E. JORDAN and J. E. KINDRED, of the University of Virginia. London and New York: D. Appleton and Co. 1926. Pp. 613. 25*s.*

THIS book differs from the ordinary students' book on the subject in scope and detail. Among its best features are the chapters and sections given to general considerations, such as sex-determination and recapitulation. These are well and clearly put, and give a fair and just conception of the points at issue. The majority of the illustrations are good, but some are crude and of little value as exponents of the text. The histological details of structure and formation are a prominent and good feature. The treatment of the general subject matter of the book itself does not rise in any way above the ordinary level; on some points the authors are not in agreement with what is usually taught in this country to-day. More attention might, with advantage, have been paid to correction of proofs and verification of references; in this connexion we may point out that Prof. Thomson's papers on the ovum appeared in the (English) *Journal of Anatomy* in 1919.

The book is clearly printed and well produced, and has at its end a chapter on laboratory work, in which are some excellent figures of sections of embryonic stages in certain lower animals.

MONOGRAPH ON BIOCHEMISTRY.

Lecithin and Allied Substances: the Lipins. Second edition. By HUGH MACLEAN, M.D., D.Sc., Professor of Medicine in the University of London, St. Thomas's Hospital; and IDA SMEDLEY MACLEAN, D.Sc., F.I.C. London: Longmans Green and Co., Ltd. 1927. Pp. 220. 10*s.* 6*d.*

THIS volume of the well-known series of monographs on biochemistry deals with the lipin side of the chemistry of the fats, and with their biological significance. Together with the monograph on the fats by Leathes and Raper it forms a complete and up-to-date account of these problems. Fortunately for students and others the authors have followed the same system of nomenclature as did Leathes and Raper, and the monographs can thus be read together with profit.

The book is divided into seven parts, the first of which introduces the subject with an explanation of the nomenclature and a classification of the lipins. The several groups of lipins are then dealt with, together with those alleged lipins upon whose constitution there has been so much controversy. Plant lipins are also discussed, but perhaps to the general reader the most interesting section is that dealing with lipins from the biological standpoint. Here the authors have reviewed the effect of injecting lipins into the blood, the part played by the lipins in the coagulation of blood, and more fully, the function of lipins in fat metabolism. The last named section is also one of particular interest. In this edition the chemical side of the work has been brought completely up to date; it is noteworthy that the recent work of the American school, headed by Levene, on the structure of lecithin and kephalin, has been included.

FIFTH AVENUE HOSPITAL CLINICS.

First series. New York: Paul B. Hoeber, Inc. 1927. Pp. 336. $5.

IT is the custom for the staff at the Fifth Avenue Hospital, New York, to meet twice a month. At these meetings, which are open to all the practitioners and nurses of the city, papers are read and hospital material discussed. The reports of these meetings, together with reprints of some articles published in connexion with cases in the hospital, have been compiled into a book which it is hoped to publish annually. This first number, beautifully produced and illustrated, contains some 26 articles

and over 60 photographs and illustrations. The range of subjects is large and the standard uneven. An interesting account of the dietary arrangements of the hospital by Sarah Hickcox, the "supervising dietitian," is included, also a good symposium on thyroid gland diseases. The "attending oral surgeon" contributes an account of the oral department, and concludes with a plea for closer coöperation with other departments. Dr. E. J. Rhodebeck gives a preliminary report on a study of urea feeding. One glaring set of misprints is unfortunate. In an account of the discovery of insulin there is mentioned several times a "Dr. McCloud," presumably intended to denote Prof. McLeod. The volume contains many interesting discussions of cases and of special points of surgical technique or pathology.

MOTHER AND UNBORN CHILD.

By SAMUEL RAYNOR MEAKER, Associate Professor of Gynæcology, Boston University School of Medicine. London: Baillière, Tindall and Cox. Baltimore: Williams and Wilkins Company. 1927. Pp. 207. 11*s.* 6*d.*

THIS is an excellent little book of information and advice for the prospective mother. It is well written, packed with sensible suggestions, and easy to understand. It is to be hoped that its price, which is by no means excessive considering its value, will not prevent the middle-class prospective parent from purchasing it. The earlier chapters are concerned with anatomy and physiology; the development of the fœtus is traced and then the signs and symptoms of pregnancy discussed. In a very good chapter on the prediction of the baby's birthday and certain other predictions there are sections on heredity and maternal impressions which serve to clear away a lot of mediæval superstition, still persisting to a surprising degree among intelligent people. The hygiene of pregnancy and certain troubles and discomforts are dealt with next in a sound fashion; the rest of the book on the arrival of the baby, the management of the new-born child, &c., is on orthodox lines. A special word of praise must be given to the chapter on the lying-in mother; this stage of maternity is too often neglected in a book of this nature, the mother being scarcely mentioned after the baby is safely born. The author wisely remarks, "the ideal end-result in obstetrics is a normal baby and a perfectly healthy mother." It is only by a careful attention to the care of the mother during the puerperium that many gynæcological complaints can be avoided. Advice to the mother as to the part she must play in this important and often difficult time is set out in this book more fully and clearly than in many a text-book of midwifery.

HEALTH SUPERVISION AND MEDICAL INSPECTION OF SCHOOLS.

By THOMAS D. WOOD, A.M., M.D., College Physician, Adviser in Health Education, and Professor of Physical Education, Teachers' College, Columbia University, &c.; and HUGH GRANT POWELL, A.B., M.D., Lecturer and Assistant Physician, Teachers' College, Columbia University. London and Philadelphia: W. B. Saunders Company, Ltd. 1927. Pp. 637. 35*s.*

As the work of the school medical service involves little specialised medical knowledge, but mainly the application of the common stock of medical knowledge to the problem of the school-child, books on the subject naturally concentrate on the social and administrative questions which arise in this branch of public health effort. The book follows this path. The authors are thorough in their treatment of the problems involved and something—usually a great deal—is said about almost every difficulty which the school medical officer may encounter in his day's work. Unfortunately, the social ideals and legislative and administrative procedure in America are peculiar to that country, and therefore much that can be read in this book, although interesting, is of little practical value on the eastern side of the Atlantic. The authors have evidently confined their study to the writings of their own nationals and the book does not appear to have been prepared for foreign consumption. As an example of the publisher's art it falls somewhat short of the usual high standard, and the style in which it is written is not very attractive. It may well be, however, that the numerous examples included of forms and documents used by different States and towns in connexion with school medical work will be useful to those who are engaged in this branch of the public health service, and that they will find a good deal of pertinent matter dotted through the book.

Reports and Analytical Records.

VITA-WEAT CRISP BREAD.

(MANUFACTURED BY PEEK FREAN AND CO., LTD., LONDON, S.E. 16.)

"Vita-Weat" claims to be "all the wheat nothing but wheat" and to be made from 100 per cent. stone ground whole wheat. The process of preparation is said to preserve all the vitamins, a statement which is probably correct so far as "B" is concerned as this is the most thermostable of these bodies. Sir W. Arbuthnot Lane has reported that the 100 per cent. "whole wheat English crisp bread now being made in London contains just such materials as are absolutely essential to a vigorous condition of health." On analysis the following results were obtained:—

Carbohydrates consisting of starch, altered starch, sugars natural to wheat, hemicelluloses, &c. ..	71·00 per cent.
Protein	10·32 ,,
Moisture	4·90 ,,
Ash	2·60 ,,
Fat	7·90 ,,
Fibre	3·28 ,,
Calorie value per lb.	1846

The matter soluble in cold water amounts to 17·8 per cent., of which 2·8 is sugar derived from the wheat. Since wheat contains from 2 to 3 per cent. of fat it is evident that some other fat has been added during preparation. It will be noted that the calorie value is high. The crisp bread has a pleasant texture and flavour; it is undoubtedly a valuable foodstuff, more particularly in respect of its content of vitamin B, the deficiency of which in white bread and preparations of white flour is causing concern in medical circles.

BEEFEX.

(BEEFEX, LTD., 19–20, WEST SMITHFIELD, E.C.)

This preparation is of a fluid consistency, dark in colour, and with a salty meat-extract flavour. When analysed the following results were obtained:—

Water	34·9 per cent.
Total solids	65·1 ,, ,,
Consisting of mineral matter	20·8 ,, ,,
Meat fibre and coagulable proteins.. ..	3·76 ,, ,,
Albumoses and peptones	8·57 ,, ,,
Meat bases	24·46 ,, ,,

Out of the total of 20·8 per cent. of mineral matter, 12 per cent. was found to be sodium chloride. The preservatives salicylic and boric acid were tested for with negative results. The analytical results are consistent with those of a concentrated meat extract.

THE LANCET.

LONDON, SATURDAY, JUNE 11, 1927.

THE PREVENTION OF DIPHTHERIA IN LONDON.

LAST year, in addressing the Institute of Hygiene,[1] Dr. J. D. ROLLESTON drew attention to a tendency in the medical profession to regard diphtheria as on the down grade, whereas in London the disease has, in point of fact, shown a steady increase during the past 15 years. In the weekly returns of the Registrar-General and of the Metropolitan Asylums Board the toll that it takes in sickness and death stands out as heavier than that of any other complaint save measles and pneumonia. The same is true for the capital city of Canada where, though the case incidence of diphtheria has been almost stationary for some years, the mortality-rate has risen sharply during the last 18 months, as is shown in the figures given by Dr. B. HANNAH and Dr. L. M. MURRAY from the Toronto Riverdale Isolation Hospital.[2] Yet in New York diphtheria has exhibited a marked decline in recent years. In that city, since 1916, over 630,000 children have been tested by the Schick method and more than 400,000 have been immunised. To this Dr. ROLLESTON ascribed the significant difference in the attack-rate, agreeing with the chief medical officer of the Ministry of Health, who in his report for 1925 states that "as antitoxin has proved itself the best method of treatment, so immunisation appears to be our best prophylactic." The Ministry is so satisfied with this line of treatment and prevention that it has determined to urge its adoption by local authorities, but the largest of these, the London County Council, despite the report on active immunisation against diphtheria, drawn up for it by Dr. J. GRAHAM FORBES, decided in October, 1925, not to introduce toxin-antitoxin treatment into its scheme for the care of school children and has adhered since to this decision. Dr. FORBES's report in extended form has now been published by the Medical Research Council.[3] His figures show the incidence and mortality of diphtheria to be higher in London than in any other large city in Great Britain and higher than that of almost any other European capital.

Between the years 1921 and 1925 there were 65,000 cases in London, some 4000 of them fatal, the death-rate being nearly 1 per 1000 of the child population under 15. Dr. FORBES's charts and maps show that a close relationship may in some areas be traced between the incidence of diphtheria and the density of population and the degree of overcrowding. The London municipal authorities have made little progress in promoting active immunisation; until quite recently Holborn was the only borough in which there was any provision for it. Special clinics were opened last year for testing and immunising in Westminster and Camberwell, and this year in Deptford; but Holborn alone has figures to show for its work among the children under the care of its guardians at Mitcham. In 1921 there were 17 cases in one school of 600–700 boys; in 1922 there were 32 cases, and in that year testing was started, when 30 per cent. were found to be positive, and of these over two-thirds (380 boys) were immunised. In the year 1923–24 there was one case of diphtheria in these schools, in 1924–25 there were none, in 1925–26 there were two—being children whose parents had refused consent to immunisation. In the infirmary, where immunisation was not carried out, there were 12 cases in 1924–25 and 19 cases in 1925–26. Other institutions were found to yield equally striking figures. Dr. FORBES surveys the whole country and gathers further figures from Europe and America. The evidence is cumulative, although he is content to state that it "appears sufficiently convincing to justify the experienced opinions of all who have devoted much study to the problem, and hold that the Schick test and immunisation constitute one of the most notable advances in the sphere of preventive medicine." The problem, as he says, calls for the closest coöperation between all the authorities concerned. Both toxin and toxin-antitoxin must be accurately standardised and must be derived from a trustworthy source. The testing demands an exact technique and experience in reading results, but in the hands of a trained observer is simple and harmless. Dr. W. H. PARK[4] was able recently to cite over 2,000,000 injections in the United States without ill-result. Dr. FORBES wisely lays emphasis on the necessity for using every possible precaution in the preparation and use of the material.

The duration of immunity following a toxin-antitoxin injection appears to be at least six years, a period which will tide the child over the most susceptible time of its life. Since immunity develops slowly after inoculation, taking six months or more to reach its acme, it is idle to postpone the measure until the disease becomes epidemic or the child has already come into contact with infection, although an immediate temporary protection, lasting about three weeks, can be secured by a small dose of antitoxin. The occasional occurrence of diphtheria in a Schick-negative individual, or in one who has been immunised, cannot be denied, but there is no doubt that the great majority of inoculated children are efficiently protected and that the very small percentage who develop the disease have it in a mild form. The preventive measures recommended for London include an organised campaign by the controlling authorities, instruction to nurses, teachers, health visitors, maternity and child welfare workers, and the establishment of school clinics and special clinics at welfare centres and hospitals. Since the disease falls more heavily on the children under 5 years of age, the work among mothers of infants is at the heart of the campaign. The estimated cost of protecting all those now on the school rolls is between £85,000 and £100,000, which may be set against the actual cost of diphtheria to London ratepayers in the year 1921, which was estimated in the neighbourhood of £500,000. The sum of £30, which is what a diphtheritic child costs London, would protect 200 children from contracting diphtheria. The Edinburgh public health department has been able to test and protect (if necessary) nearly 10,000 children for an expenditure in material of about £900. Dr. A. JOE remarks[5] on the willing response of the Edinburgh parent and the recent development of the campaign among the pre-school children. It is not usual for London to fall behind other cities in matters of public health or child welfare, and the publication of Dr. FORBES's report by the Medical Research Council will, we hope, be sufficient to secure appropriate action.

[1] Jour. State Medicine, 1926, xxxiv., 187.
[2] Canadian Medical Assoc. Jour., February, 1927, p. 187.
[3] Medical Research Council, Special Report Series 115. London: H.M. Stationery Office.
[4] New York State Med. Jour., 1926, xxvi., 347.
[5] Edinburgh Medical Journal, June, 1927.

TRADITION IN MEDICINE.

THE influence of tradition over social progress can be illustrated in many fields by the consideration of medical history. A small volume by Dr. BERNHARD J. STERN,[1] emanating from the Faculty of Political Science in Columbia University, sets out to demonstrate how far this mode of reasoning can be employed, and although it is intended that its pages should be read in the light of previous sociological studies issued in the same series and dealing with social factors of a more conservative nature than the science of medicine ever can be, the fundamental questions put by Dr. STERN show how well medicine can be made a chosen field of inquiry. Premising that the term culture is used throughout the book as the equivalent of social heritage—that is of accumulated knowledge—he asks to what extent and why are innovations or changes in culture resisted, and what are the psychological and sociological factors involved. He proceeds to consider these questions, and others arising directly out of them, in two ways, using the history of medicine for the source of his examples, first by an inquiry into the circumstances which retard the dissemination of new learning, and second by an examination of the various steps by which medicine has progressed. These make tremendous subjects for discussion in one slender volume, but by the help of copious and detailed references the ground is fairly surveyed in a superficial manner, with excellent indications for more intensive study.

The factors involved in retarding social change are mainly psychological, as Dr. STERN recognises, and in emphasising the influences of persistent habit reactions, of the desire to avoid unpleasant situations, and of the fear of the unknown, he furnishes a criticism of common social procedure which is of definitely medical application. Threats to economic vested interests, which he next discusses, can hardly be said to have played much part in medical developments, but in this section he treats of the power of tradition, as it is manifested in reverence for authority, leading to unwillingness to analyse new claims or to subvert recognised teaching. Here all must see the pertinence of his arguments to the development of a science, and here the author makes a brave attempt to interpret the status of medicine as a science. He emphasises the difficulties exemplified by various conflicts in medical theory and medical practice, where each side has been taken with equal vehemence by authorities who, he appears to assume, have been of equal competence. The assumption, of course, begs the question, for in most of the necessary differences of opinion which have been manifested in the developments of progressive science the opponents were not actually of equal competence; they only appeared to be so because they were vested with equal academic authority or had been engaged in equally important researches. Individually they were not equated. The officials of the learned society who declined to accept clinical cases from THOMAS ADDISON in illustration of his discoveries were not of equal competence with the discoverer, though they appeared to be, and while temporarily they may have impeded the dissemination of his views, the truth prevailed, as it will. The opposition to HARVEY'S theory of the circulation of the blood was endorsed by many famous anatomists, but the mere fact that the attempts to confute him did not take the shape of anatomical demonstrations proves—unless we are to assume deliberate cowardice and chicanery on the part of a group of learned men—that HARVEY'S arguments were not really understood. When they were grasped opposition ceased. Similarly, LISTER'S main opponents in London, though standing in professional repute and by academic degrees on the same plane which he occupied, were in no sense his intellectual equals. The opposition to LISTER is not accurately described by Dr. STERN, but it forms an excellent example of the power of tradition in the working, for the resistance to innovation was based upon the reasoning of persons who, being themselves badly informed, were betrayed into illogicality. The opponents of LISTER seized upon minor errors in technique, forgetting that no innovation when first presented is entirely perfect; but the cavilling criticisms were not long effective in obscuring and discounting the importance of the discovery, or in delaying its acceptance, or in perpetuating the ancient procedures.

Dr. STERN concludes with a very just criticism of medical history as it at present exists, namely, that it is too much a study of biographies, so that individuals who have contributed to the development of medicine are removed from their scientific background and given an exaggerated importance. While all can see that progressive changes may start with the activities of gifted individuals, the measure of their responsibility is not clear in many of the places where their names remain in association with the reform. We ought to consider how far these changes might have occurred without the work of those who are accredited with the discoveries, and how far each man builds on the accumulated knowledge of others. As a commentary on this possibility he gives a list of multiple discoveries and inventions in the history of medicine, which is of melancholy interest in recalling many wrangles over priority. The list has been compiled from the writings of many authorities, and, although not perfect, records ample proof of the frequency with which great minds in medicine have thought alike. And how should it be otherwise, considering the common training which their minds have received, and the common nature of the problems which life places before them?

[1] Social Factors in Medical Progress. By Bernhard J. Stern, Ph.D. London: P. S. King and Sons, Ltd.; New York: Columbia University Press. 1927. Pp. 136. 9s.

PERINEAL PROSTATECTOMY.

IN few branches of surgery has so much advance been made within recent years as in the treatment of the hypertrophied prostate. The removal of adenomata of the prostate, from being an operation associated with grave risk to the patient, has become a relatively safe procedure in the hands of the experienced urologist. The dangers of death from uræmia, shock, hæmorrhage, sepsis, and heart failure have been reduced to the minimum by diligent preoperative preparation, scrupulous care on the operating table, and thoughtful after-treatment. Long series of operations by the suprapubic route with an almost insignificant mortality are reported by leading urinary surgeons in this country, and the results have been so good that there seems to be little need for the development of a different technique. It was with great interest, therefore, that on May 23rd the Royal Society of Medicine welcomed Prof. Hans Wildbolz, of Berne, who read a paper in the Urological Section upon the results of 300 prostatectomies by the perineal route. He attributed his good results—6·5 per cent. of deaths—to careful study of the condition of the patient before operation and to the employment of a particular technique. He does not advocate operation in the early stages of prostatic hypertrophy,

as he does not think it fair to expose the patient to the slight risk entailed unless the prostatic enlargement has reached a degree at which the kidneys are suffering from back pressure or infection has taken place. Death from uræmia has been abolished almost completely by carrying out renal efficiency tests, but Prof. Wildbolz warns his colleagues against too implicit a trust in the test. Results which show that considerable damage to the kidney has taken place are not always incompatible with a successful issue; it is better, while bearing in mind the results of efficiency tests, to depend upon clinical acumen or intuition to determine whether operation should be undertaken or not. He related the history of a patient which showed well that no case, however bad, should be regarded by the surgeon as hopeless. The man was admitted to hospital in uræmic coma with convulsions; he had overflow incontinence, 260 mg. of urea in 100 c.cm. of blood, and an arterial pressure of 180 mm. Hg. Drainage was instituted, the symptoms of uræmia disappeared, the blood-urea fell to 140 mg. in three weeks and to 73 mg. in five weeks, and when it ultimately returned to normal a prostatectomy was undertaken successfully, the patient having remained well since. When preliminary drainage of the bladder is necessary Prof. Wildbolz prefers an in-dwelling catheter to the suprapubic opening, for the man with a suprapubic opening regards himself as an invalid and cannot get about his normal occupation, whereas with a catheter tied in he feels himself to be almost normal, and the weeks of waiting for the recovery of renal function are scarcely regarded by him as part of his illness.

Prof. Wildbolz made an interesting remark on the changes in the level of the blood-urea following perineal and suprapubic operations. After a preliminary drainage of the bladder he has found that a suprapubic operation may be followed by an increase in the blood-urea of 60 to 70 mg. during the first few days, whereas only occasionally after the perineal operation is any increase seen; often, indeed, there is a diminution in the amount of urea in the blood. This fact, if confirmed, would be a strong argument in favour of the perineal operation over the suprapubic. The advantages claimed for the former are that there is less danger of lung sequels, owing to the fact that the anterior abdominal wall is not interfered with, less strain is thrown upon the heart, and there is less shock. It is also asserted that the bleeding at the perineal operation is less, the damage to the tissues is not so great, better drainage is provided, and healing is quicker. Of the 300 cases quoted 227 had healed within two weeks and 44 within three weeks. Hæmorrhage is more completely under control with the perineal approach, at all events when, as in Prof. Wildbolz's particular method, the end of the membranous urethra is sutured to the internal meatus of the bladder—a procedure which favours the obliteration of the prostatic cavity. The disadvantages of his method are the risk of injury to the rectum and incontinence of urine. The rectum was injured in 7 of the 300 cases, but in none did permanent ill-effect arise. Incontinence of some degree occurred in 11, but the loss of control was not complete and occurred only when the intra-abdominal pressure was suddenly raised, as in coughing or sneezing or during some violent exertion. In only five patients did it last longer than four months, and in all it finally disappeared. No stricture of the urethra occurred in this series.

The results of perineal prostatectomy as practised at the Berne Surgical Clinic are certainly remarkable, although compared with the best results from the suprapubic operation there seems to be little numerical advantage; expert operators, in fact, arrive at the same degree of success by either route. The suprapubic method requires less technical ability, and by this approach the patient is not exposed to the risk of that most distressing of all complications—incontinence of urine. There would seem, however, to be cause shown for exploring anew the possibilities of perineal prostatectomy.

Annotations.

"Ne quid nimis."

BIRTHDAY HONOURS.

MEDICINE is represented in various categories of honours published on H.M. The King's sixty-second birthday. Dr. Edward Farquhar Buzzard becomes a Knight Commander of the Victorian Order, while a knighthood has been conferred on Lieut.-Colonel Louis Edward Barnett, C.M.G., professor of surgery in Otago University, and on Dr. Charles James Martin, C.M.G., F.R.S., Director of the Lister Institute of London. Sir Farquhar Buzzard's eminence in all branches of neurology has equalled his early prowess in athletics. Sir Louis Barnett is one of the founders of the College of Surgeons of Australasia and presided over the recent Australasian Medical Congress held at Dunedin. Sir Charles Martin's name is associated with large schemes of preventive medicine in many parts of the British Commonwealth, and under his guidance research has borne much fruit for 20 years at the Lister Institute. In the Victorian Order Mr. Henry Linnington Martyn, surgeon-apothecary to the Royal Household at Windsor, has been appointed Commander. Major-General John Macfarlane Sloan, C.M.G., D.S.O., late R.A.M.C., and Colonel Charles Pye Oliver, C.M.G., late Territorial Army, have been made Companions of the Order of the Bath, while Lieut.-Colonel John Cyril Holdich Leicester, I.M.S., lately officiating surgeon-general to the Government of Bengal, has been made Companion of the Indian Empire. In the Order of the British Empire the title of Knight Commander has been conferred on Mr. Charles Percy Barlee Clubbe, consulting surgeon, Royal Prince Alfred Hospital, and that of Commander upon Surgeon-Captain Alfred James Hewitt, R.N., Dr. Neil Morrison Macfarlane, P.M.O., Basutoland, and upon Dr. William Marshall Philip, lately M.O.H., Colombo Municipal Council, Ceylon. The rank of Officer in the same Order has been conferred upon Surgeon-Commander Guy Leslie Buckeridge, R.N., Dr. Attalio Critien, chief Government medical officer and superintendent of public health, Malta, Dr. Charlotte Elizabeth Ferguson-Davie, in recognition of services in the Straits Settlements, Major Charles Morgan Finny, R.A.M.C., Dr. Edmund Lloyd, of the Church Missionary Society, Sudan, Dr. John Randall Phillips, senior member of the Legislative Council of Barbados, Major John Heatley Spencer, R.A.M.C., and upon Captain Harold Williamson, I.M.S., while Kobad Dhunjibhai Mugaseth, a medical practitioner of Calicut, Madras, has been made a Member. The list of Commanders of the Order of the British Empire also contains the names of Miss Joanna Margaret Cruickshank, R.R.C., matron-in-chief of Princess Mary's Royal Air Force Nursing Service, whilst among the Officers are those of Miss Harriet Lassell, matron of the Kasr-el-Aini Hospital, Cairo, Miss Sarah Lovell, head nurse of the London County Mental Hospital at Claybury, and of Miss Eliza Grace Musgrove, matron of the Devon County Mental Hospital. Membership of the Order has been conferred upon Miss Bridie Maureen Copeland, Miss Mildred Shirley Low, superintendent health visitor and inspector of midwives in Warwickshire, and upon Miss Annie Newman, head nurse of the London County Mental Hospital at Horton. The Kaisar-i-Hind Medal of the First Class has been awarded to the Rev. Caleb Davies, a graduate in science and medicine of Manchester University, for his splendid work among the Santals, one of the aboriginal jungle tribes of Bengal. Other recipients of this Medal are Dr. Ethel Adelaide Douglas, medical officer in charge of the Kinnaird Women's Hospital, Lucknow, who has recently made a survey of medical needs for the National Christian Council of India, and Dr. Carl F. Kugelberg, of the Swedish Mission, Madras. On behalf of the medical profession we tender hearty

congratulations to the recipients of all these honours, not forgetting Mr. George Goodchild, clerk and steward of the Hereford County Mental Hospital, and Miss Georgie May Smith, general secretary of the Official Medical History of the War.

TRACHOMA IN HOLLAND.

WHEN trachoma was first recognised among the people of Holland, about the year 1860, it was given the name of "the Egyptian complaint" on the assumption that it had been introduced by Napoleon's troops. This legend fails, however, to account for its special predilection for Jews, and in particular for those dwelling in Amsterdam. In a recent note to the Hygiene Committee of the League of Nations, Dr. N. M. Josephus Jitta[1] suggests that the history of the disease, so far as we know it, is best accounted for by the immigration of Polish Jews into the Low Countries during the eighteenth century. Most of them went to Amsterdam, probably carrying trachoma with them. In those days the Jewish immigrants belonged to that social stratum which is chiefly attacked by trachoma, and constituted a class which had little intimate contact with its fellow citizens. This hypothesis explains many obscure facts.

It was about 1880 that Prof. Gunning first raised the alarm and drew attention to the serious endemic among Jewish children; in one school 75 per cent. of the pupils were affected, while in schools where the children were from equally poor homes, but not Jews, the percentage was less than 1. Dr. Westhoff's report to a Commission in 1885 ended with the words, "If radical measures are not taken it may be stated that in another century our citizens will be like the Egyptians, who were part-blind and among whom nobody possessed normal vision." In consequence the municipality founded an ophthalmological clinic, school teachers were warned, and various public bodies attacked the social side of the problem. The number of cases gradually declined, and with advancing civilisation the conditions under which trachoma flourishes became rarer. Nevertheless, in 1913 Dr. Sajet calculated that there were 1400 persons in Amsterdam with active trachoma, and another 1120 in whom the condition was latent. In the same year the Municipal Council appointed a commission to inquire into the subject, and their report was published in 1924.[2] These workers examined all the trachomatous individuals and their families that they could find through the schools and clinics. They found 8·8 per cent. of Jewish school-children and 0·6 per cent. of others suffering from trachoma, and of these the great majority had no functional disturbance and had never had any treatment. To oculists accustomed to deal with grave cases this was naturally a shock. They found further that if the children were treated in this early stage they were cured quite easily and without corneal complications. Their charts show that most children are infected before their sixth year and that contagion at school is not an important ætiological factor. Thus the source of infection is essentially in the home, generally the mother. The provision of special schools would therefore be of little use in checking the endemic. In 1918 a special clinic was opened in the Jewish quarter, an oculist was appointed to inspect public schools, and untreated trachomatous children were forbidden to attend school. In 1921 results began to appear, and for the next two years the numbers attending at the clinic steadily declined. Moreover, of the 31 children classed as "cured" in 1922, only one had visual defect due to corneal involvement. The treatment at the clinic began with expression of the granulations under cocaine-adrenalin, together with firm massage to the extent of drawing a few droplets of blood. Silver nitrate or ichthargan was then instilled, and most cases were cured without admission to hospital. Dr. Jitta's note brings this story up to date. The diminution in cases has continued, so that in 1925 only 18 new cases were detected. It thus appears that 50 years of strenuous spade-work, patience, and perseverance have had their reward, and that Amsterdam has made it clear that where trachoma is not truly endemic, but imported, and maintained by conditions of poverty and dirt, it can be effectively combated.

[1] Office International d'Hygiène Publique, Bull. mensuel. February, 1927, xix., 2, p. 200.
[2] Wibaut and Smit: Annales d'Oculistique, vol. clxi.

RESISTANCE TO THE METASTATIC SPREAD OF CANCER.

ONE recent development of cancer research—viz., the experimental production of cancer by various forms of chronic irritation—dates from the well-known work done on spiroptera cancer by Prof. Johannes Fibiger, of Copenhagen. Prof. Fibiger has now published, in conjunction with Dr. P. Moller, the results of an important investigation entitled Investigations upon Immunisation against Metastasis Formation in Experimental Cancer.[1] Twenty years ago it was shown that if a transplanted tumour underwent absorption the animal which had carried that tumour could not again be inoculated successfully with a transplantable neoplasm. This phenomenon was described as "immunity" or "resistance." The same condition could be induced by the injection of normal cells of the same species, embryo skin being a particularly active "immunising" agent. These observations naturally aroused great expectations at the time, because they seemed to offer the possibility of immunising an organism against cancer. It was soon found, however, that cancer spontaneously arose in animals which had been immunised. Since the number of cases in which this could be observed was for obvious reasons very small, it was necessary to test this important point again in animals in which cancer could be produced experimentally. The present paper records observations on 293 mice, which were tarred on alternate days for four months. Of these mice, 156 received injections of embryo skin emulsion during the process of tarring, while the remaining 137 mice were kept as controls. The same number of tar tumours appeared in both groups and at approximately the same time. This result confirms the earlier observations in showing that "immunisation" is no protection against the genesis of a new tumour. But when the formation of metastases in these experiments was examined it was found that in the immunised mice only half the number showed metastatic spread as compared with the control mice. In the latter group metastases were found in 58 per cent. of the cancerous mice, while the immunised mice showed metastases in only 30 per cent. of the cancerous animals. The authors make a special point of warning their readers against the premature therapeutic application of these results to human cancer. The nature of this process of immunisation is still very obscure, but the conclusion seems justified from these observations that in the metastatic spread of malignant cells the organism does not play merely a passive part, but is capable of offering an active resistance.

[1] Kgl. Danske Videnskabernes Selskab, Biologiske Meddelelser, vol. vi., 1927.

THE RELATION OF TEMPERATURE AND PULSE-RATE IN DISEASE.

THE introduction of increasingly trustworthy laboratory methods of diagnosis in febrile illnesses is said to lead to some degree of carelessness in clinical observation. There remains, happily, a host of careful clinicians who guard against this tendency themselves and check the medical student's besetting sin of piecing together reports. In the *Medical Journal of Australia* for April 2nd Prof. D. W. Carmalt-Jones, of the University of Otago, N.Z., contributes an interesting series of clinical observations on the

relation of temperature and pulse-rate in disease. After illustrating the close correspondence between the pulse-rate and the temperature chart when both are plotted in acute infectious diseases, he emphasises the clinical significance which attaches to deviations from this rule. It is assuredly true that though the clinical thermometer supplies a means of graphically recording the body's response to infection with a relatively small margin of error on the part of the observer, the pulse-rate will frequently give warning of grave complications, especially of a myocardial nature, which may be overlooked if the temperature chart alone is considered. During the influenza epidemic of 1918, when cases were admitted to military hospitals in thousands daily, it was a common experience that selection for immediate special treatment of those patients who exhibited marked pyrexia was a very poor guide to the real gravity of the cases, whereas an experienced nurse could, by observation of the pulse-rate, pick out the more serious cases with a high degree of accuracy. In surgical practice this aspect of clinical observation has long been recognised, a rising pulse with a falling temperature being, as Prof. Carmalt-Jones points out, of the gravest significance. In some hospitals it has been found that in cases of suspected spreading peritonitis the surest guide during the hours immediately following admission is to keep a record of the pulse-rate every half hour, without reference to the temperature, and on this indication alone early and successful operation has been performed at a time when the other clinical signs remained doubtful. In more chronic pyrexial conditions it is as a guide to the condition of the myocardium that a pulse chart becomes most useful. In cases of good resistance in which recovery occurs without damage to the heart muscle, the pulse-rate falls with the temperature, and any delay in the fall of the pulse-rate relative to the temperature is in proportion to the myocardial damage done. It remains to be recognised that pulse-rate records require more care on the part of the observer than do similar records of temperature. Even a junior nurse will look twice at her thermometer, and possibly take the patient's temperature again, when the reading is in any way surprising; but we have again and again been struck by the unwondering calmness with which a normal pulse-rate is recorded by an otherwise skilful nurse in cases of heart failure, where only a proportion of ventricular pulsations is in reality reaching her fingers over the radial artery. This is a point which seems to escape proper comment in many teaching hospitals, and it is one which Prof. Carmalt-Jones might well have stressed in his paper. In continental hospitals the daily volume of urine secreted is sometimes used as the most accurate index of the cardiac function; again, accuracy and simplicity of recording are the criteria which must decide the utility of the method, and again it must be admitted that, like pulse charts, urine charts are not as easy to obtain as are the more familiar records at the bedside.

THERMOPHILIC BACTERIA IN MILK.

As our knowledge of bacteriology extends we are finding the range for bacterial growth, both in relation to temperature and to other environmental conditions, greater than was once supposed possible. There are, for example, halophilic bacteria which flourish in solutions of salt, inimical for most bacteria. Another interesting group is that of the thermophilic bacteria whose optimal growth temperature is well above normal body temperature and is generally in the neighbourhood of 55° C. While this group is of no direct significance in human pathology, it is of some importance in commercial processes, particularly in relation to canned foodstuffs. In a recent paper[1] Miss Eckford discusses the significance of thermophilic bacteria in milk. A distinction must be drawn between true or obligate thermophiles with a range of growth from 42° to 70° C. and an optimal growth temperature of 50° to 60° C., and facultative thermophiles which grow best at 37° C. or other lower temperatures, but which can also grow at 55° C. Many of the common sporing aerobes, such as *B. mesentericus* or *B. subtilis*, can accommodate their growth to the higher temperature. The author introduces a third group, the thermotolerant bacilli, which grow best at the higher temperatures but which can grow at blood heat. All the strains studied from the Baltimore milk-supplies were aerobic spore-bearing bacilli. Their liability to cause decomposition changes in foods depends on the extent to which they possess proteolytic and fermentative properties. While most can liquefy gelatin and some produce acid from sugars, none caused gaseous fermentation and their proteolytic powers were absent or slight. They are not likely to be a cause of decomposition changes in canned foods or to alter milk, although some of the isolated strains grown in milk at 55° C. in pure culture were able to coagulate it. They have some significance in connexion with pasteurisation, since they survive this treatment. The obligate thermophiles were found not to multiply in milk at 62° C. On the other hand, the thermotolerant types multiplied greatly at this high temperature and particularly at 55° C. These strains, therefore, may cause trouble to pasteurising plants by multiplying during the process and giving the milk a high count. They may cause pin-point colonies at 37° C. Their existence is one of the causes of high counts after pasteurisation, a condition which occurs from time to time. Sweetened and unsweetened canned milk tins were investigated but no true thermophiles were found in them. The only organisms which developed at 55° C. were bacilli of the mesentericus-subtilis group, This is in accord with the findings of J. Weinzirl in U.S.A., although W. G. Savage and R. F. Hunwicke in England found obligate thermophiles in sweetened milk in a number of instances and one strain in unsweetened milk. These strains were, however, unable to initiate unsoundness and were regarded as of no practical importance by their discoverers. The only exception at present to the view that thermophilic bacteria are not a cause of decomposition changes in foodstuffs is the observation by E. J. Cameron and J. R. Esty (1926) of unsoundness changes from this cause in canned corn and other vegetables, giving rise to what they call "flat sour" spoilage.

[1] M. O. Eckford: Amer. Jour. of Hygiene, 1927, vii., 201.

A COMPREHENSIVE STUDY OF POSTURE.

THE subject of correct posture and of departures from it and their treatment has received far more attention in the United States of America than in this country, or indeed, in Europe generally. In the U.S. Public Health Reports this subject has been recently reviewed[1] by Dr. Louis Schwartz, who gives a bibliographical list of 154 publications, beginning with the quaint "Anthropometamorphosis" by John Bulwer, of 1650, but not including some articles on the subject which have been published in the last year or two in our pages and elsewhere in this country. Some orthopædic surgeons in the United States have attributed far-reaching pathological results to faulty habits of standing and sitting, and the existence of an American Posture League testifies to the place such matters occupy in the public attention. In this country faulty posture is regarded as the result rather than as the cause of illness, and due to a general weakness and lack of postural tone in the skeletal muscles. Too much, perhaps, has been made by some writers of the contrast between the spinal curves of the quadrupeds and anthropoids on the one hand and of man on the other. In a paper published in 1886 D. J. Cunningham showed[2] that

[1] A Résumé with Comments of the Available Literature relating to Posture, by Louis Schwartz, Surgeon, United States Public Health Service, Washington, May 6th, 1927.

[2] The Lumbar Curves in Man and Apes, by D. J. Cunningham. A paper read before the Dublin Academy and abstracted in Nature, 1886, xxxiii., 378.

these differences are not great. The lumbar curve was found to be present in a well-marked form not only in chimpanzees, but also in most of the lower apes and even under certain conditions in some quadrupeds —e.g., the bear. Writers on posture are apt to assume that the anthropoid apes habitually adopt the quadrupedal attitude and mode of progression. Yet a glance at the illustrations in W. Köhler's "Mentality of Apes" [3] will show that in none of the six plates of the various activities of chimpanzees is a single ape on all fours. The value of the three curves of the spinal column as a composite spring, which absorbs shocks transmitted through the lower extremities towards the cranium and brain, seems to have been overlooked by most writers on this subject. Dr. Schwartz summarises the position thus:—

1. There is a lack of agreement in the various definitions of standards and tests for good posture.
2. Heredity, type of build, balance of muscle strength, and tone have not been given sufficient importance in establishing standards for posture.
3. It has not been established whether the faulty postures associated with certain diseases are the causes or the results of these diseases.
4. There is no universally satisfactory test for physical fitness.

The bibliography should be useful to students and future writers upon this subject.

FLUID TENSION IN THE EYE.

THE thesis which Dr. W. S. Duke-Elder[4] sets out to demonstrate in an important monograph is this: that the nature of the mechanism of the formation and circulation of the aqueous humour, as at present classically accepted and taught, is wrong. The aqueous, he contends, is neither a secretion, nor in the accepted sense a transudate from the blood; it is a dialysate from the capillary plasma, the essential dialysing membrane being the capillary walls. Under normal conditions, while an interchange due to metabolic activity constantly occurs, and an internal thermic current exists, the aqueous humour does not circulate actively through the eye, but is in equilibrium with the capillary blood; at the same time constantly occurring changes of pressure, induced by muscular movements, &c., superimpose upon it secondarily a minimal and intermittent circulation. We have quoted the author's own words because no condensation of them would give a correct idea of his thesis, which he supports by arguments based on the general chemical composition and physical properties of the aqueous both in normal and abnormal states. That the phenomenon of intraocular pressure is not to be explained by a specific secretory force is proved, the author maintains, by the fact that even the excised eye has a tension of 8 to 10 mm. Hg, which it retains for some considerable time and only loses gradually on the disintegration of the lining cells. There must be a lining structure which acts as a relatively waterproof membrane, and it is suggested that such a membrane is formed by the endothelium of the cornea, the endothelium and epithelium covering the iris and ciliary body, and the retinal epithelium supported by the membrane of Bruch. It is further suggested that the aqueous humour, being in thermodynamic equilibrium with the capillary blood, is without an active circulation in the generally accepted sense of the term, but that it is essentially stagnant, apart from the osmotic interchange of the constituents of the two fluids and apart from an intermittent circulation due to the activity of the external and internal musculature, assisted probably by the rhythmic variations of the ocular pulse. The canal of Schlemm acts as a safety-valve mechanism to aid in the maintenance of the intraocular pressure at its normal level. The author supports his argument by the results of the histological method of injection and of physiological experiment. The view that the aqueous is a secretion from glands in the ciliary body may be traced to the papers published more than 30 years ago by Treacher Collins, but Dr. Duke-Elder combats the idea that these so-called glands have any secretory function. The rival theory, that the aqueous is formed by a pressure transudation from the ciliary body, that it circulates through the eye, and finds exit by the canal of Schlemm is also examined and found wanting. The theory suggested is that the intraocular fluid is a simple dialysate from the capillary blood, the dialysing membrane being the capillary walls. There is perhaps no part of ocular physiology that has given rise to more controversy than this, as may be judged by the copious bibliography which is appended to this essay. Its practical bearing is by no means slight, especially in connexion with the pathology of glaucoma and of cataract. This paper is well calculated to serve as a challenge to those who hold to the older theories, and it will doubtless receive the attention that it deserves.

[3] Translated by Ella Winter, B.Sc. London: Kegan Paul. 1925.

[4] The Nature of Intraocular Fluids. By W. Stewart Duke-Elder (Henry George Smith Research Fellow). Being the Sir Francis Laking Prize, 1926–27, from the Biochemical Department, St. George's Hospital, London British Journal of Ophthalmology.

AN INTERNATIONAL ENCYCLOPÆDIA OF INDUSTRIAL HYGIENE.

TWO further fascicles have reached us of "Occupation and Health," which is being published in sections, from Geneva by the International Labour Office. These covers contain 11 articles, bringing the total issued so far up to 68. The work is appearing simultaneously in French and English, while the original articles may have been written in Spanish, Italian, German, or Dutch, according to the nationality of the authors. At times evidence appears of difficulties with translation; such are inevitable when highly technical processes are being described, but they are commendably few. The most important of the new articles are those dealing with tuberculosis and silicosis, miners' nystagmus, coal-miners' diseases, and the woollen industry. In each case the contributions to knowledge made by British investigators are noted—indeed, they form the foundation of each article. Thus the findings of the British Committee on Miners' Nystagmus are carefully stated and accepted regarding this disease and its prevention—viz., that more light, always more light, is needed at the bottom of the mine. The article dealing with this subject is excellent and quite up to date. The most weighty of the new articles is that dealing with the influence of industrialism upon the prevalence of tuberculosis. Statistics drawn from many sources are used to support the argument maintained, that three factors determine the incidence of tuberculous infection—namely, the individual, his environment, and his occupation. In this article it is unfortunate that the curve belonging to age-period 15–19 is ascribed to age-period 50–59 and vice versa. Reference is made to the influence, from the occupational point of view, of opportunities for infection, of alcoholism, and, in particular, of the specific effect exerted by inhaling silica dust. The subject of silicosis in reference to pulmonary tuberculosis is here concisely stated and brought up to date. The article dealing with coal-miners' diseases (apart from nystagmus) contains illustrations of men at work in continental coal-mines, and statistics of coal-mining and the diseases associated with it in various parts of the world, including Great Britain. Although the figures are not all presented in the same way, which may lead to difficulty in grasping their full significance, there appears no reason to doubt that coal-miners as a whole suffer little from tuberculosis, but much from other respiratory diseases, while they have something like a monopoly of septic infections of the palm of the hand and of the knee. Their high death-rate from accident holds good all over the world, increasing with the depth of the mine. Fortunately, preventive measures have kept British accident figures below those of most other countries.

THE DOUBTFUL VALUE OF ISOLATION IN SCARLATINA.

THE recent claims of Dr. C. Chapin, of Providence, U.S.A., with regard to the importance of the isolation of cases of scarlatina, have drawn a statistically-armed reply from Dr. Peter M. Holst in the *Tidsskrift for Den Norske Laegeforening* for April 15th. According to Dr. Chapin, isolation of cases of scarlatina means, in practice, the isolation of most of the severe cases, whereas many light cases not only escape isolation but also the diagnosis and treatment of a doctor. He suggests that the most severe cases represent particularly virulent strains of organisms, and that the consistent isolation of these severe cases has helped to suppress such virulent strains; further, that in this hypothesis is to be found at any rate a partial explanation of the tendency scarlatina has shown of late to become a comparatively harmless disease. His statistical material is handled so as to show that the decline of virulence of scarlatina has gone hand in hand with hospitalisation. In his criticism of this teaching, Dr. Holst points out that the great decline in the mortality from scarlatina in Norway occurred ten years before it was demonstrable in Sweden, although no one could claim that this difference was due to isolation being more effective in Norway. In 1880 the mortality from scarlatina in Norway was 13·6 per cent. In Sweden in the same period it was 17 per cent. In 1895 it was 3·9 per cent. in Norway and 6·8 per cent. in Sweden. In 1907 Trodhjem, in 1910 Bergen, and in 1921 Stavanger abandoned the isolation and hospitalisation which had hitherto been enforced in cases of scarlatina, putting it, except in some details, in the same category as measles and whooping-cough. In Oslo, however, the old regulations with regard to isolation and hospitalisation are still in force, and a comparison of Oslo with Bergen with regard to the incidence of the disease shows that the former has uniformly suffered much more than the latter. In the five-year period 1900–04 the mortality from scarlatina was 1·8 per cent. in Bergen and 3·3 per cent. in Oslo, the morbidity being also considerably higher in Oslo. In the five-year period 1915–19 the morbidity in the two towns showed the same great difference, and while the mortality was only 1 per cent. in Bergen, it was 1·9 per cent. in Oslo. After referring to the experience of Helsingfors, where hospitalisation has failed to achieve results commensurate with the cost thereof,[1] Dr. Holst concludes that the case for enforcing costly hospitalisation for scarlatina at the present time is not proven.

THE CAUSE OF RHEUMATOID ARTHRITIS.

NOTHING useful is known of the causes which lead up to the first attack of rheumatoid arthritis. It may, and often does, affect a single individual in a family among whom it is impossible to distinguish any difference of constitution, dietetic proclivity, or exposure to infection. What is known of the disease is the inexorableness of its course when it has once started; it is as though a person should have complete prevision of the future with total loss of memory of the past. The discussion, which took place at the Section of Comparative Medicine of the Royal Society of Medicine on May 25th, was postponed for a week in order to give opportunity to the very large number of speakers who desired to take part in it; but, searching as was the discussion, it may be held to have laid bare our ignorance rather than to have contributed to our knowledge. There were advocates present of the principal ætiological theories in which the condition is regarded as primarily infective or primarily nutritional. The evidence adduced was for the most part mutually destructive. If, for example, the disease were due directly or indirectly to deficient nutrition surely its progress could be arrested by the diet rich in vitamins which is one of the first prescriptions of any modern doctor called in to treat any chronic ailment of obscure origin. The large class of cases showing pyrexia, enlargement of the spleen, and inflammatory exudate strongly suggests an infective condition at some stage of the disease; yet the argument that if due to infection the disease would surely be more common among those who live poorly and closely together is not easy to answer. Dr. M. J. Rowlands, who introduced the discussion, produced evidence of the sterility of the synovial fluid in 40 cases of rheumatism and rheumatic arthritis examined by him in 1914–15 and of the association of a similar condition in animals with a colon bacillus infection of the urine. In the course of the discussion prominent biochemists pointed to the lowered resistance to infection brought about both in animals and human beings by serious deficiency in certain accessory factors of food. It seems, in fact, to be almost the rule when vitamin A is deficient. Deficiency of vitamin B, on the other hand, produces some change in the lymphoid tissue and some thinning of the intestinal wall which may be a prelude to the diffusion of bacterial poison from the alimentary canal. The growing evidence of the composite character of vitamin B should, however, render us chary of drawing any definite conclusion from the evidence as at present before us. It may be that all the morbid changes observed in various cases, including the bacilluria and the intestinal toxæmia, are the effect and not the cause of the rheumatoid condition. Such a discussion may have value, but rather in the direction of stimulating controlled research than in building up a framework of facile theory.

A PIONEER IN IMMUNOLOGY.

IT is announced that Dr. Abraham Zingher died on Sunday last in a laboratory at the Willard Parker Hospital, New York, being asphyxiated by coal-gas which had escaped unnoticed from a bunsen burner. Dr. Zingher was assistant professor of hygiene in the University of New York and had spent most of his professional life in that city. He was in his forty-second year, and graduated from Cornell University College in 1908. For the last ten years he had been associated with Dr. W. H. Park, to whom he was assistant, and these workers have done a great deal towards the introduction of Schick-testing and active immunisation against diphtheria. It is primarily owing to their efforts that these measures have been accepted by the medical profession and the public, and their success is shown by the fact that some 2 million inoculations have been carried out in New York. A campaign has been set on foot to rid the city of diphtheria by 1930, and should reasonable success attend this attempt the result will be a splendid monument to the work stimulated from the Willard Parker Hospital. Besides this Dr. Zingher's name will be associated with the research on scarlet fever, for he investigated the use of the Dick test and of antitoxin and studied active immunisation against the disease. With the natural zeal of the keen man he had here, perhaps, shown a slight tendency to accept conclusions without demanding such a weight of evidence as was needed to satisfy him in the earlier research on diphtheria. All this recent work owes much to him, however, and many European visitors to New York will gratefully remember Dr. Zingher's enthusiasm and ready courtesy in arranging to demonstrate the work of testing and inoculation that was going on under his direction.

HOSPITALS AND PANEL PATIENTS.

THAT there is not only a "bottle of medicine habit," but a hospital habit has become increasingly evident since the war. The great extension of hospital facilities for the treatment of disease during the last few years has induced many people who are quite well able to pay for ordinary medical attention to resort to the voluntary hospitals, and the consequence is

[1] See Dr. Max Björksten's important monograph, Der Scharlach in Helsingfors in den Jahren, 1800–1914.

that, to say nothing of waiting-lists for beds, almost every out-patient department is seriously congested. If one patient involved only one attendance the difficulty might be soluble, but the great voluntary institutions now count their out-patient attendances by tens of thousands in a year, and the strain is becoming too heavy to be borne either by finance or physical accommodation. It is therefore not surprising that the London Hospital should have decided to place some limits to its readiness to treat all comers. In future it will rule out panel patients altogether, save when they produce a letter from their panel doctor stating why the help of the hospital is required. In view of the necessary limitations of panel practice many such occasions must arise though their proportion should be small. For the increasing tendency of this type of patient to resort to the hospitals no responsibility rests upon the panel doctor. The increase year by year in the number of prescriptions issued to insured persons bears witness to the fact that the panel doctor is taking the lion's share in the treatment of trivial illness. In the majority of cases the panel doctor does not send his patients to hospital; he is, in fact, usually unaware of their action. But it is obviously unfair and unreasonable to expect a hospital to do for nothing work for which the panel practitioner is paid, and it was assuredly never the intention of the originators of health insurance legislation that the beneficiary should be able to flit at his own good pleasure from his private doctor to the nearest hospital when his ailment is such as to come well within the limits of medical benefit. The experience of the London Hospital is that it is being constantly asked to treat trivial illnesses which fall naturally within the province of the panel doctor, and it is performing a public service in refusing any longer to be made the victim of what is usually little better than caprice. It is not only not shutting its doors to any genuine "hospital case," but is augmenting its power of dealing with such cases by barring the relatively unimportant.

THE Registrar-General's Statistical Review of England and Wales for the year 1925 has been completed by the issue of Part III. Text, which is now on sale at H.M. Stationery Office, price 5*s*. This contains the official analysis of the vital statistics contained in Parts I. (Medical) and II. (Civil), issued last year.

The Services.

ROYAL ARMY MEDICAL CORPS.

Lt.-Col. J. G. Foster, having attained the age for retirement, retires on retd. pay.

Maj. E. H. M. Moore to be Lt.-Col., vice Lt.-Col. J. G. Foster.

Capts. to be Majs.: K. M. Nelson and D. McVicker.

Lt. K. Fletcher-Barrett to be Capt.

H. T. Chiswell to be Temp. Lt.

MILITIA.

Maj. H. K. Ward relinquishes his commn. and retains the rank of Maj.

TERRITORIAL ARMY.

Maj. J. Taylor resigns his commn. and retains his rank.

Maj. H. N. Burroughes, having attained the age limit, is ret. and granted the rank of Lt.-Col. with permission to wear the prescribed uniform.

Capt. V. H. Wardle to be Maj.

COMMISSIONS IN THE ROYAL ARMY MEDICAL CORPS.

A limited number of commissions in the Royal Army Medical Corps will be offered by nomination in July. Candidates, who must be under 28 years of age on August 1st, should submit their applications, not later than July 15th, to the Under-Secretary of State, the War Office (A.M.D.1), Whitehall, London, from whom further particulars may be obtained.

Modern Technique in Treatment.

A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.

CCXXVII.

THE TREATMENT OF FEMORAL HERNIA.

THE treatment of femoral hernia is governed by two factors. First, it is anatomically impossible to control the neck of the sac from without, palliative treatment by a truss is therefore at best unsatisfactory. Secondly, strangulation is more frequent than in any other variety of external hernia, and when it occurs is of a more dangerous type. For these reasons treatment by operation is, in most cases, the wiser course. Advanced age or disease may render any operation inadvisable, but the risks of a general anæsthetic may be avoided by the use of local anæsthesia, which is particularly well suited to operations upon femoral and inguinal herniæ. Treatment by a truss is less objectionable in the larger herniæ. Where the sac is lax and a good impulse is felt on coughing, and where the canal is large enough to admit two fingers, the risks of strangulation are very much less than in the common type of hernia which is small, tense, and gives hardly any impulse on coughing. In large herniæ, however, it is difficult to find a truss which can be tolerated by the patient.

The majority of femoral herniæ are irreducible from their first appearance; if the attempt succeeds, there is no tendency for the contents to remain reduced, for the crural ring, once forced, remains patent owing to ligamentous nature of its boundaries. It is impossible to apply any pressure which will effectively keep the peritoneal sac closed. The mass which can be felt in Scarpa's triangle in these cases consists for the most part of alternating membranous and fatty coats; a swelling the size of a walnut will usually contain a sac no larger than the last phalanx of the little finger. When such a sac has been emptied, only the contents are returned to the abdomen, and the coverings remain as an elastic mass in Scarpa's triangle. The small sac lying in this mass cannot be effectively controlled by the pad of the truss. The funnel-shaped neck lies deeply under the inner end of Poupart's ligament, and must always remain open, inviting recurrence.

Again, a femoral truss can neither be kept in place nor worn with comfort. Movements of the body occur around certain planes, and leave their impress on the surface as flexure lines upon the skin of which the creases in the palm are the best-known examples. The flexure line corresponding to movements between thigh and trunk, well seen in the obese, runs transversely across Scarpa's triangle from the pubic spine on the inner side to the region of the top of the great trochanter. The pad of an inguinal truss lies wholly above this line, and moves with the trunk. The pad of a femoral truss must lie athwart it, and can therefore never rest firmly on subadjacent parts, or be free from discomfort.

The frequency of strangulation in femoral hernia is accounted for by the unyielding nature of the structures surrounding the neck. When strangulation occurs, these same factors lead to early gangrene and perforation of the intestine. Further, the symptoms of strangulation may not be associated by the patient with the presence of a femoral hernia, which she knows to be there. Zachary Cope has observed that the peritoneum of the posterior abdominal wall, from which the sac of a femoral hernia is derived, is less sensitive than the anterior abdominal peritoneum which lines an inguinal sac. Localised pain is sometimes so inconspicuous that the patient may mistake the vomiting and colic of a strangulation for symptoms of food poisoning, and may take an aperient, making matters infinitely worse.

For these two reasons, the inefficacy of the truss and the danger of strangulation, the patient should be advised to submit to operation unless there are cogent reasons for avoiding this course.

Type of Operation.

An operation designed for the radical cure of any hernia should fulfil three requirements: the isolation and emptying of the peritoneal sac, the closure of the sac at its neck, and the repair of the hernial opening at its commencement, in order to prevent the formation of a fresh sac.

The special features of femoral hernia are concerned with the character of the hernial opening. The crural canal, along which a femoral hernia passes, is a compartment of

the femoral sheath, and its wall is derived from the fasciæ lining the abdominal cavity. It is closed above by a fibrous diaphragm, the septum crurale. Normally it contains loose fat. It transmits a number of lymphatic vessels, by which lymph passes from the deeper subfascial inguinal glands surrounding the femoral vein to the external iliac group of abdominal lymph glands. It also acts as a resilient washer lying beside the femoral vein as it passes under Poupart's ligament, and allowing that vessel to expand when, under conditions of muscular exercise, the volume of blood returning along it may increase as much as eight- to ten-fold. Because of this relationship to the femoral vein, any method of closure which fastens down the inner end of Poupart's ligament to the pubis, whether by suture or by a metal staple, is unsound. Such a procedure depresses the ligament along its whole length, and makes it constrict the femoral vein. Moreover, as this ligament is an integral part of the attachment of the abdominal musculature, it will not remain in its new position. Stitches cut out, while staples are apt to work loose from the bone and so cause serious trouble.

The operations for femoral hernia are of two main types: those where the sac is approached from above Poupart's ligament through the inguinal canal, and those where it is approached directly from Scarpa's triangle. The former approach allows the sac to be tied off at its neck, and is also satisfactory from the point of view of closure of the canal, but it does not permit the isolation of the sac from its surroundings. In the operation performed entirely from above, the whole sac with all its coverings has to be pulled under Poupart's ligament into the inguinal incision, thereby tearing an unnecessarily large hole in the fibrous structures of the canal and rendering closure difficult. It is only necessary to remove the peritoneal sac. The remaining coverings should be left undisturbed in the crural canal, as they help in the obliteration of the space.

The approach from below does not permit direct access to the neck of the sac. The wall of the bladder is not uncommonly drawn down into the crural canal on the inner side of an old-standing hernia, and can only be stripped off the neck of the sac with some difficulty. If the surrounding tissues have been cleared without the aid of direct inspection, it is very easy to include the bladder in the stitch which transfixes the neck of the sac, or even to cut away part of its wall. The combined route is therefore preferable in all cases.

The Standard Operation.

1. An incision is made along the line of the inguinal canal, and is then carried vertically downwards for 2 inches over the saphenous opening. As in all curved incisions, it is advisable to scratch the skin transversely before cutting in order to ensure accurate approximation afterwards. The wound is deepened to expose the external oblique over the length of the inguinal canal, the inner end of Poupart's ligament, and the coverings of the femoral sac. Cutaneous vessels, which are very numerous, are secured with pressure forceps as they are encountered, and tied off.

2. The coverings of the hernia are now divided in turn with Mayo scissors till the peritoneal sac is opened. The interior is inspected, and any contents returned to the abdomen. If they are adherent at the neck no attempt is made to detach them till later. The edges of the sac are caught with fine forceps, and all coverings stripped off by blunt dissection till the peritoneal sac is freed right up into the crural canal. The neck is clamped with a pair of artery forceps and the remainder of the sac cut away.

3. The inguinal canal is now opened by incising first the external oblique and then the cremaster muscle. The cord or round ligament is lifted from its bed and held out of the way in the loop of a pair of tissue forceps, exposing the posterior wall of the inguinal canal consisting of transversalis fascia. This is incised immediately above and parallel to Poupart's ligament. If the forceps which grasp the neck of the sac are now thrust upwards the latter is pushed up into view through the soft extraperitoneal fat. The forceps are then removed, the neck caught up, and brought into the wound. In this situation it is very easy to free any omentum which is adherent, and, by trimming the edges, to close the opening in such a manner that no dimple is left on the abdominal surface of the peritoneum.

4. The hernial opening is now closed at its abdominal end by extending the attachment of the conjoined tendon further along the ilio-pectineal line, so that it lies close to the femoral vein, and interposes a barrier of muscle between the abdominal cavity and the crural canal. The crural canal itself is reinforced by drawing the fatty coverings of the sac into the empty space left by its removal. With the right hand two or three mattress sutures of stout catgut are passed first through the lower edge of the conjoined tendon, then through Astley Cooper's ligament (the thickened upper edge of the pectineus fascia on the ilio-pectineal line), then down through the crural canal into the fatty coverings of the sac which have been left in situ, then back through the crural canal to the conjoined tendon. Meanwhile the forefinger of the left hand is kept on the femoral vein, pressing it outwards out of the way. When these sutures are tied, the lower edge of the conjoined tendon is drawn down to the pelvic brim just inside the femoral vein, and a fatty plug from the saphenous opening is drawn up under Poupart's ligament, forming a firm yet resilient pad.

5. The cord is now replaced, the cremaster and external oblique muscles sutured, and the skin wound closed.

Operation in Large or Recurrent Hernia.

In old-standing femoral herniæ, or in those which have recurred after operation, the peritoneum and its coverings become adherent to all structures under Poupart's ligament, so that satisfactory isolation of the neck from below is impossible. In such cases, after exposing and opening the sac as in the standard operation, Poupart's ligament should be divided ¼ of an inch from its pubic attachment and thrown outwards. This procedure makes the exposure of the peritoneum and repair of the canal much more easy, and, in a difficult case, involves much less damage than an attempt to clear an adherent sac from below. Division of Poupart's ligament is better than detachment of the pubic spine. No disability follows if the ligament is carefully sutured at the end of operation.

In some old femoral herniæ the protrusion becomes so large that Poupart's ligament is dislocated forwards, and the neck of the sac comes to lie in front of, as well as internal to, the femoral vessels. The method of repair outlined above is not sufficient in such cases. After removal of the sac and closure of the peritoneum by the inguinal route, the weak area must be repaired with strips of fascia lata ½ inch wide, and taken from the whole length of the thigh. Gallie's needle as sold for plastic operations with fascia lata is too large for this operation, and a similar needle only an eighth of an inch wide is better. The fascial strips are passed from the conjoined tendon down to Astley Cooper's ligament, up through the edge of Poupart's ligament, and then back to the conjoined tendon. This suture is continued inwards until the whole weak area is bridged by a lacing of fascial strips, only allowing comfortable room for the femoral vein and artery to pass into the thigh. No attempt should be made to draw the fascial bands tight; they protect the gap by their own strength rather than by drawing surrounding parts together. This method has proved very successful even in large and old-established femoral herniæ.

Femoral Hernia in Childhood.—While the majority of femoral herniæ are seen in adult women who have borne children, they may also occur in childhood. Before puberty the incidence in both sexes is the same, and such herniæ probably occur in congenital sacs. In these the sac may be closed from below, and Gimbernat's ligament sewn to the fascia over the pectineus. It is better, however, to operate by the combined route as in adults.

There are only two *complications* of importance—injury to bladder and thrombosis of femoral vein.

Gross injury to the bladder is very unlikely to occur if the operation is carried out by the combined route. Slight hæmaturia occurring on the day after operation may be due to disturbance of the wall of the bladder by blunt dissection, or possibly to a stitch having penetrated part of the musculature. If the condition of the wound is satisfactory, a catheter should be tied into the urethra for 48 hours, to prevent any overfilling of the bladder and tension of its walls.

Thrombosis of the femoral vein is due to injury of the wall of the vessel. It is perhaps more likely to occur after the operation performed entirely through the inguinal canal, as the dislocation of the sac from above involves forcible pulling upon structures which are firmly adherent to the vein. Clean dissection lessens the risk of thrombosis. Stagnation of the circulation is a contributory factor, and for this reason gentle daily massage to the thigh should be employed and movements of the limb encouraged during the immediate post-operative period.

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Special Articles.

INTER-STATE POST-GRADUATE ASSEMBLY OF NORTH AMERICA.

VISIT TO LONDON, JUNE 1ST–3RD, 1927.

LAST week we reported the inaugural session of the congress held in London by a large number of medical men from the United States and Canada who are visiting this country under the auspices of the North American Post-Graduate Assembly. During the congress a series of short lectures were given by Sir Crisp English, Dr. Murray Levick, Dr. L. S. T. Burrell, Mr. H. D. Gillies, Mr. W. E. Miles, Prof. Hugh MacLean, Mr. T. P. Dunhill, Mr. H. W. Carson, and Sir StClair Thomson. On Thursday a demonstration was given in the museum of the Royal College of Surgeons, and on Friday evening there was a reception at the Royal Society of Medicine. The papers which follow are among those which were read at the congress. The contributions of Sir Crisp English and Dr. L. S. T. Burrell appeared in our columns last week.

THE POST-FEBRILE TREATMENT OF INFANTILE PARALYSIS.

BY G. MURRAY LEVICK, M.R.C.S.

THE post-febrile treatment of infantile paralysis requires special knowledge of several branches of treatment. No case should be considered to have had every available treatment that has not received (1) postural treatment administered in the light of modern orthopædic teaching; (2) treatment by light; (3) electrical treatment; and (4) massage.

Postural Treatment.

When the attack has been extensive, so that a large number of muscles have been affected, the patient should be kept in bed for a long time, and in cases where the trunk or the lower limbs are extensively affected it is much better to keep the patient in bed for many months. Experience has shown that there is much to be gained and little to lose by this measure, provided that the following treatment is adopted. So long as acute tenderness persists in the muscles of a limb, that limb should be splinted, great care being taken to prevent the pressure of bandages over the affected muscles. This is most important.

In the case of the lower limb, the sole of the foot should be kept at a right angle with the leg, or, when tibialis anticus is the chief consideration, slightly dorsiflexed. When tenderness has disappeared, I think the use of rigid splints should at once be abandoned—with the exception of the rectangular splint for the foot, of which more will be said later—and a method of slinging the limb adopted in its place. The leg may be slung by bandages from a bar fixed longitudinally over the bed, a padded gutter splint being used to prevent the pressure of the bandages upon the calf muscles. If the glutei are affected, the leg is slung just clear of the bed. If the psoas is affected and the glutei are not, the leg is raised to a higher level in order to relieve traction upon the psoas, and if the quadriceps are not affected, the knee may, with advantage, be flexed.

The rationale of this method is as follows. Our object is to assist recovery of tone in those muscles that have partial or temporary disturbance of their innervation. The effect of a rigid splint is to prevent recovery of tone. In fact, it is known to cause loss of tone even in a muscle that has a normal innervation, and use is made of this knowledge when a splint is applied to a fractured limb. By slinging the limb this influence of the splint is to a great extent avoided, and there is no traction on the affected muscles. The patient may be encouraged to move the limb at will in such a way as to restore function, these movements—possibly very feeble and scarcely perceptible—being made possible by its suspension on the bandages which absorb its weight. It is, indeed, almost as if the limb were floating in water. Even before any voluntary movement is possible, the reflex effect of the slight swaying motion frequently produced in the limb by movements of the patient's body help the return of muscular sensibility, which may be functionally suspended, and reflexly tend to promote nutrition and tone. This treatment, if it can be carried out, is much to be preferred to early ambulation with the limb supported by a caliper, because a caliper has the effect of a splint in regard to muscular tone and function.

Mention has been made of a support for the foot. I use a Jones foot splint, but with a cushioned strap, which passes from behind the heel round dorsal angle of the foot and keeps the heel well home, obviating the need for tight strapping or bandaging around the foot and leg, which is disastrous to the nutrition of the enveloped tissues.

The suspension of the upper limb by slinging, when the deltoid is affected, can be beautifully carried out. During the stage of acute tenderness, however, if it is possible, the limb is best splinted on a Fairbanks abduction splint. This excellent splint keeps the limb in the best possible position, but a common mistake is to pass a bandage or strap round the upper arm, so as to displace the head of the humerus downwards to the lower margin of the glenoid cavity. This malposition is sometimes impossible to rectify later on, and produces a permanent functional paresis in the deltoid, even if that muscle should recover a satisfactory innervation and nutrition. The limb can be kept in place upon the splint by a bandage round the forearm only, and the splint may be padded under the upper end of the humerus to ensure that the head of that bone is not displaced downwards when the limb is slung. A bandage is passed under the arm close to the axilla, so as to pull the head of the humerus upwards. The patient is encouraged to use the hands—as in sewing or knitting—because the movements so produced upon the suspended limb, and the functional effect of this activity, are just the influences most desirable for the paretic deltoid, and there is never any chance of stretching its fibres.

When the muscles of the back are weakened, the patient should not be allowed to get up until everything has been done to restore their strength as far as possible. To avoid spinal deformity, the patient may be kept in the prone position in bed, by means of a pelvic band, with a triangular cushion under the chest. Children are very comfortable and happy in this position, and its effect in strengthening the weakened erector spinæ muscles is very satisfactory. Before the patient is allowed up permanently he should be removed from the bed daily for exercises and electrical treatment to ensure that everything has been done to strengthen the erector spinæ muscles preparatory to his assuming the erect position. If this measure were thoroughly enforced, I am convinced that many patients would be saved from spinal deformity.

Treatment by Light.

After placing some hundreds of cases of infantile paralysis on treatment by natural and artificial light, I am now convinced that this form of treatment is of great benefit. It seems to me that the improvement in the nutrition of the nervous system of patients undergoing a carefully regulated light treatment is on a par with that noted in the bones of rickety children. Just as the rapid increase in the retention of lime salts in the body, following this application of light, causes a corresponding calcification of the bones in rickets, so the nerve centres appear, by the retention of other nutritional factors, to recover from malnutrition. Many patients who have suffered recently from an attack of acute

anterior poliomyelitis exhibit symptoms of neurasthenia, and these symptoms clear up wonderfully under light treatment. The X ray evidence available in the case of the bones is here wanting, but the clinical symptoms are too marked to be disregarded.

In infantile paralysis we may find that many anterior horn cells are completely obliterated. On the other hand, many are temporarily affected, afterwards to recover, as shown in the regeneration of their axons. Therefore there must be many that tremble in the balance between regeneration and degeneration, and it is just here that the effects of light treatment are so useful in turning the balance in favour of recovery. It is partly on account of the neurasthenic after-effect in the more severe cases of acute anterior poliomyelitis that I have so strongly recommended a prolonged treatment in bed. This can easily be undertaken in such a special establishment as the Heritage Craft Schools at Chailey, where the education and treatment of these patients proceeds concurrently and in accordance with the medical aspect of each individual. With well-to-do patients there is, of course, no difficulty.

In addition to the general constitutional effect of the irradiation, we must not overlook the direct effect upon the nutrition of the muscles. This effect, which is marked, is, I think, due to the action of the red rays. I have dealt fully with this matter in a paper[1] read at the International Congress of Radiology in London in 1925. Special lamps fitted with red screens, for the application of intense red light to the affected limbs, are now available.

I would like especially to point out the danger of disappointing results where the treatment is given by those who are unversed in the delicate operation of heliotherapy. This treatment requires care and discrimination. It demands a clinical experience of the complaint with which we are dealing as well as the technical and scientific details involved in the application of heliotherapy, and, above all, a hospital training. The publication of the paper above referred to has, unfortunately, been followed by the exploitation by manufacturers of lamps for the production of red light and ultra-violet light; these are being purchased on all sides by those who administer the treatment in a manner that can only lead to erroneous conclusions.

Bearing this direct effect of the red rays in mind, it will be seen that the treatment of patients by a mercury-vapour lamp alone falls short of the possibilities offered by a more comprehensive application. As far as artificial light is concerned I prefer my own arrangement of a mercury-vapour lamp plus a group of carbon filament lamps fitted with red screens for use when it is desirable to reduce the infra-red radiation in order to render an intense red radiation supportable. So long, however, as the skin shows no signs of overheating I prefer to discard the red screens so that the whole of the rays are absorbed by the patient.

At the Heritage Craft Schools, when patients suffering from infantile paralysis are undergoing special treatment, I am particular that the light treatment shall be uninterrupted. In the winter they have artificial light treatment either daily or three times a week, whilst in the summer they have real sun treatment carefully administered when this is possible; when the weather is overcast, they have artificial light. There are three hospitals attached to these schools, and at each there is a solarium for real sun treatment and a special department for artificial phototherapy. In many cases of infantile paralysis treatment by light has proved a real boon because of its effect in raising the recuperative powers. Prolonged rest in bed, plus phototherapy, is an important measure that may greatly influence the prognosis; without phototherapy the treatment in bed may produce debility.

In addition to the muscular atrophy, there is another type of malnutrition that calls for local irradiation. Many cases exhibit profound vascular disturbance leading to stagnation of the blood-supply with consequent blueness and subnormal temperature of the limb. These are the patients that suffer most severely from chilblains in the winter months, and irradiation of their limbs with the carbon filament lamp will be found very useful as a remedial and (better still) as a preventive measure; in this case it may be well to discard the red screen so as to obtain the full infra-red radiation. In establishments where the patients are much exposed to the winter air, the affected limb should afterwards be clothed in a loose and light windproof material. Such a covering, over a woollen sleeve mit or stocking, is better than several layers of woollen material, a fact well known to members of polar expeditions.

[1] British Journal of Radiology, April, 1926.

Electrical Treatment.

The electrical treatment of peripheral nerve injuries and diseases is a special and separate branch of electrotherapeutics. Only by the provision of separate and special training for those who undertake it can efficient electrical treatment for anterior poliomyelitis be secured. A search into neurological or electrotherapeutic literature leads to disappointment, but it is in the technique that teaching is most needed.

There are several types of electric current to be mentioned in this connexion. The *diathermy current* is of great use in promoting circulation in limbs that suffer from severe atrophy, but it should be an axiom that this application is unsafe and unjustifiable unless it is given by a qualified medical man who has made a special study of the subject, or by an assistant working under his direct supervision—that is to say, actually in his presence. I am convinced that lay operators may do much insidious damage to the deep tissues—e.g., the sealing up of lymphatic channels, or even worse damage—without any sensation informing the patient and without injury to the skin. With this warning I would reiterate the opinion above expressed as to the benefit to be derived from the use of diathermy.

The interrupted *galvanic current* should be employed, by the longitudinal method, for the treatment of muscles that give no response to faradic currents. In most cases rather large button electrodes should be used, and the affected muscles should be picked out for treatment separately, so that the extent to which each muscle is stimulated may be gauged at each treatment.

There is a threefold reason for applying interrupted galvanic current to muscles temporarily isolated from the influence of their motor nerves. After no more than half a dozen closures of the galvanic current, administered as above advised, the blue skin of a chilled atrophic limb covering the muscle will take on the bright red hue that indicates an active arterial circulation. This evidence of vasodilatation in the skin may be taken as an indication of a similar change in the circulation of the muscle beneath it, because the current penetrates this muscle. In addition, there is the physiological effect of counter-irritation. Thus we secure oxidation and nutrition of the sarcomeres, which justifies the production of a series of contractions that take place through the concentration of hydrogen-ions at the cathode each time the circuit is closed. At each contraction, we are to suppose, on the acceptable teaching of Prof. A. E. Schaffer, the contractile substance passes into the tubules of the sarcous element, which dilate for its reception. Thus the elasticity of the skeletal structure is maintained. Without this galvanic stimulation such activity is impossible, the contractile substance remaining outside the tubules in the relaxed muscle-fibres, so that there is grave risk of a loss of contractility in the muscle, which may be permanent, so that the subsequent regeneration of the nerve axons is ineffectual.[2]

In place of the interrupted galvanic current condenser discharges may be substituted. These produce

[2] Reference may here be made to my paper in the Journal of Bone and Joint Surgery, April, 1923.

less sensory effect and are useful in the treatment of nervous children, but, in my experience, the physiological result of this method is inferior in vasomotor effect.

Great judgment is needed to ensure that the interrupted galvanic treatment of paralysed muscles is not overdone. Results are frequently spoiled for this reason. Valuable as this treatment may be when properly administered, it is better left alone if there is any fear of maladministration, because a muscle undergoing this treatment is at the mercy of the operator and may be left in a state of extreme fatigue.

In certain cases a reversing metronome may be employed so that the poles at the two electrodes are reversed at each interruption. In that case the strength of the stimulus is much increased in proportion to the strength of the current. The *faradic current* should always be employed when an efficient contraction can be obtained with a strength of current that is not unduly painful, but coils should be used that have a very stout wire in the secondary winding. In fact, the wire of the primary and secondary winding should be of equal calibre. I strongly advocate the Smart-Bristow coil as being the most satisfactory type. It can be used either with a metronome interrupter or as a surging current by employing the iron core, the latter being the most desirable method in most cases. It is never desirable to employ a continuous faradic current—i.e., a current that does not fall to zero in a rhythmical manner so as to ensure frequent and adequate periods of complete relaxation in the muscle.

In addition to the stimulation of the motor point in particular, the current should be so directed that it streams through the greater part of the muscle. This will enhance the effect of the treatment. It should be remembered that faradic stimulation of the nerve-supply of a muscle produces an effect on its tone and nutrition that cannot be obtained by the voluntary stimulus alone. In cases of partial recovery a fair contraction may be obtained, as a rule, by faradism, long before the patient can produce it by voluntary effort. Re-education and faradism should therefore proceed concurrently.

Indications for Treatment.

Frequently we are faced with the responsibility of deciding whether treatment is likely to lead to a useful result—that is to say, whether we are justified in advising the parents to seek a prolonged course of treatment that must involve considerable expense. The difficulty is greatest when the patient is seen for the first time and is suffering from the effects of an attack of anterior poliomyelitis that has occurred perhaps years ago. The affected muscles should be carefully tested, not only as to their innervation but also as to the extent to which atrophy has proceeded, and it must be decided whether the recovery of hopeful muscles is likely to be of any real use in view of the hopeless atrophy of others. To detail all the considerations that arise in such a case is impossible in a short paper. It is certain that many cases formerly considered beyond remedy have exhibited useful recovery since the comprehensive treatment above outlined has been carried out at Chailey and elsewhere.

[Dr. Levick concluded his address by describing three cases treated at the Heritage Craft Schools.]

CASE 1 is a patient now aged 17. The attack of anterior poliomyelitis occurred 15 years ago. When treatment began four years ago he had absolutely no voluntary response in his right quadriceps; four months later voluntary response began to appear. Now there is a useful recovery so that the caliper he had worn is replaced by a short outside iron.

CASE 2.—The patient suffered from the attack about two years ago, and displays the result of postural treatment for the back muscles and treatment by light. He was admitted to the Heritage Hospital annexe six months ago. He had never been able to sit upright since the attack owing to weakness of his back muscles which were extremely wasted and atonic. He was immediately posturised and given light treatment. The result is, as you see, admirable. He can already sit upright without curvature, and the muscles are rapidly returning to normal. When he came he had acetonuria. This has now disappeared under light treatment.

CASE 3.—A boy now aged 4 had an attack when aged 1, affecting quadriceps and the tibialis anticus in the right leg. He came under treatment eight months ago. He could not articulate, could not masticate or feed himself in any way, was dull and unintelligent, and had incontinence of bowels and bladder. He weighed 25 lb. and showed definite signs of rickets. Now he eats nicely, is very cheerful, and is learning to talk. Voluntary response has returned to the quadriceps. He weighs 2 st. 5 lb., and is gaining 2 lb. per week. This patient affords a fine example of the nutritional effect of phototherapy.

Lantern slides were shown illustrating Dr. Levick's method of slinging limbs affected by paralysis, as well as other means employed in postural treatment.

THE CARDIOVASCULAR CHANGES ASSOCIATED WITH RENAL DISEASE.

BY PROF. HUGH MACLEAN, M.D., D.Sc., F.R.C.P.

IN discussing cardiovascular changes associated with nephritis it is necessary at the outset to refer briefly to the different manifestations of renal disease. Within recent years elaborate classifications of nephritis have been introduced, especially by German observers, and claims have sometimes been made to the effect that such classifications permit an exact diagnosis of the nature of the pathological changes in the kidneys from a study of the symptoms. These claims, however, are more theoretical than practical. So far, no investigator has ever been able to correlate the clinical signs and symptoms of renal disease with the pathological lesion in the kidneys. The reason for this is obvious. Whatever the nature of the histological lesion, the effect on kidney function is generally the same, and since the various symptoms associated with renal disease are directly dependent on disturbances of function, it is clear that the clinical condition may differ but little whatever the exact nature of the pathological change that caused the mischief.

Broadly speaking, the different forms of nephritis may be classified under three headings: *Acute nephritis*, *hydræmic nephritis*, and *azotæmic* or *chronic interstitial nephritis*. In acute nephritis all the functions of the kidney are more or less thrown out of action. Now the chief renal functions from the clinical standpoint are: (1) excretion of fluid, (2) excretion of salts, and (3) excretion of waste products of protein metabolism. In acute nephritis we therefore find that fluid and salt are not excreted, with the result that marked œdema is often present; nitrogenous waste products also tend to be retained, and consequently there is an accumulation of these bodies in the blood.

In so-called chronic disease the whole of the kidney functions are not usually involved. In hydræmic nephritis there is a difficulty in excreting water and salt, but no difficulty whatever in excreting nitrogenous waste substances. In chronic interstitial nephritis (azotæmic nephritis), on the other hand, there is generally no material interference with the excretion of water and salts, but the excretion of waste nitrogenous products is markedly diminished. In hydræmic nephritis it follows that the most marked symptom is œdema. Azotæmic nephritis, on the contrary, is characterised by an accumulation of waste products in the blood and a low concentration of these bodies in the urine. Whether the azotæmic condition arises from a primary acute, or subacute attack of nephritis, or whether its cause is to be found in primary changes in the renal blood-vessels, is quite immaterial as far as the signs and symptoms are concerned. From a careful study of the previous history of the patient and of the condition present on examination, we perhaps may guess at the nature of the renal lesion, and subsequent histological examination may prove our surmise to have been correct. On other occasions we may be surprised to find that a clinical picture which apparently limited

the pathological condition to a certain definite histological change proves to be associated with a lesion altogether different from what we expected.

Cardiovascular Changes in Nephritis.

The association of hypertension, and consequent cardiac enlargement, with chronic interstitial nephritis has long been recognised in clinical medicine. Often in chronic disease the systolic blood pressure is found to approach 200 to 250 mm. mercury or more, while the apex beat may be well outside the middle line in the sixth or seventh interspace; along with the high systolic pressure there is a greater or less rise in diastolic pressure. This condition may be accompanied by a thickening of the walls of the peripheral arteries, but it must be remembered that unless this thickening is very marked it is often exceedingly difficult to gauge. The feel of the artery under the finger may vary considerably with the tone of the vessel wall, so that a perfectly normal artery may sometimes give the impression that it is definitely thickened, while at another time the same artery may feel quite soft. Generally speaking, the diastolic pressure is of more importance in hypertension than is the systolic pressure. A patient with a high diastolic pressure, even if the systolic pressure is not excessively high, may be considered to have a worse outlook than another patient with a similar systolic pressure but a much lower diastolic tension. Obviously, the height of the systolic pressure above the diastolic (the pulse pressure) is really dependent on the force of the cardiac contraction, and a high pulse pressure may only mean that the cardiac muscle is acting in a powerful manner.

Though hypertension is a common symptom in chronic interstitial renal disease, it is by no means always present. From time to time cases of chronic nephritis are encountered in which no obvious cardiovascular changes are present. In a patient whom I saw quite recently there was a history of chronic renal disease extending over many years. When first investigated this patient's blood-urea was 160 mg. per 100 c.cm. and his maximum urea concentration in the urine about 1·2 per cent. Examination of the cardiovascular system showed that the apex beat was in the usual position and the heart appeared to be normal in every way. The systolic blood pressure was 150 mm. of mercury and the diastolic 95 mm. Two years after this examination the patient contracted some infection and shortly afterwards passed into a uræmic state. During this uræmic period the blood-urea was 340 mg. per 100 c.cm. and the urea in the urine was 0·9 per cent. The heart appeared to be quite normal and the blood pressure was almost exactly the same as it was two years before. Thus, a patient who had suffered from chronic nephritis for many years, and who ultimately died from uræmia, showed no evidence of cardiovascular involvement as the result of his disease. I have seen several cases of this kind from time to time. Sometimes, in the terminal stages of chronic nephritis, it happens that the blood pressure may be more or less normal or even subnormal, but this is often due to a failing heart, and is then of the gravest significance. Though it is undoubtedly the rule for chronic nephritis to be accompanied by hypertension, there are many cases in which this is not so. Chronic nephritis may slowly progress to fatal uræmia without any appreciable involvement of the cardiovascular system.

Some Observation on Cardiovascular Changes following Acute Nephritis.

In severe cases of *acute nephritis* marked hypertension with cardiac enlargement may be present. This is usually a temporary feature and the hypertension subsides when the œdema passes over, while the heart gradually returns to its former size. It is unusual to find hypertension in acute nephritis unless œdema is well marked; indeed, a rising blood pressure in the absence of œdema should suggest the suspicion that we are probably dealing with an acute exacerbation superimposed on a chronic condition. In uncomplicated cases the renal lesion often clears up and complete recovery takes place. In other patients, however, the symptoms are more persistent, and the condition gradually develops into a chronic lesion. Generally, the renal efficiency goes gradually down, while at the same time the blood pressure tends to rise and the heart enlarges. This is the usual picture, but as already indicated, some of these patients progress to uræmia without any hypertension at any stage of their illness, with the exception of the acute phase. In a few others a very extraordinary result is seen. When the course of the disease is followed up for some years it is found that the renal condition, as indicated by functional tests, gradually improves so that in the course of time the kidneys appear to be more or less efficient. In these cases, however, blood pressure changes begin to manifest themselves shortly after the acute stage of nephritis has passed over, with the result that these cardiovascular changes do not tend to improve with the improvement in renal conditions, but the blood pressure continues to get higher and higher, and the heart larger and larger, until ultimately cardiac failure or a cerebral hæmorrhage, or some infection closes the scene. Apparently, therefore, it sometimes happens that chronic hypertension results from acute nephritis, without any manifestation of progressive renal disease being present. Indeed, the healing of the renal lesion seems to be accompanied in these cases by a progressive rise in blood pressure. This observation may explain some of the puzzling cases we sometimes encounter in examining patients with a definite history of having suffered from a former acute nephritis. As far as I know, this aspect of acute nephritis has not hitherto been emphasised in the literature. I hope to go into this matter very fully in a publication which will appear later.

Hypertension in Hydræmic Nephritis.

In true uncomplicated hydræmic nephritis no cardiovascular changes are seen, however severe the œdema may be. The blood pressure is not raised and the heart is not affected. It is not uncommon to find a markedly high blood pressure in cases of *apparent* hydræmic nephritis, but investigation of kidney function invariably shows that in these cases the hydræmic condition is passing into chronic interstitial nephritis. Functional tests always indicate that the kidneys are inefficient, and the hypertension is but a phase of the chronic azotæmic condition. Since hypertension is so frequently associated with œdema in acute nephritis, it might at first be expected that the extreme degree of œdema so often seen in hydræmic nephritis would also be associated with increased blood pressure. Probably the fact that in hydræmic nephritis the œdema is long-continued enables the cardiovascular mechanism to adjust itself to changed conditions. Whatever the reason, it is an undoubted fact that true hydræmic nephritis does not show cardiovascular changes. I have never seen a case of the pure hydræmic type in which the blood pressure was raised when the kidney function of excreting nitrogenous waste products was quite normal. The following are the results of tests carried out on two patients suffering from excessive œdema and ascites, and apparently, as far as the clinical signs indicated, of the hydræmic nephritis type. In No. 1 the blood pressure was raised, while in No. 2 it was normal. The figures given show quite definitely that in No. 1 the hypertension was associated with azotæmic nephritis. The condition was therefore a mixture of the two forms of nephritis.

No. 1.	No. 2.
Much albuminuria.	Much albuminuria.
Hyaline and granular casts.	Hyaline and granular casts.
Blood-urea = 75 mg. per 100 c.cm.	Blood-urea = 23 mg. per 100 c.cm.
Urea-concentration test—	Urea-concentration test—
1st hour .. 1·4 per cent.	1st hour .. 2·9 per cent.
2nd ,, .. 1·6 ,,	2nd ,, .. 3·5 ,,
Blood pressure = 180/125.	Blood pressure = 130/85.

Primary Hypertension (Hyperpiesia).

Many discussions have been waged round this form of hypertension, and it is often considered to be due

to renal involvement. It is quite certain, however, that in many cases of primary hypertension there is no involvement of the renal functions, as far as can be determined by modern renal tests. There may be, and there often is, some albuminuria, but the presence of a little protein in the urine is no criterion, per se, of the presence of renal disease. In my experience, it is not uncommon for the urine to show traces of protein when hypertension is present, even when the kidneys are found to be quite efficient. High blood pressure and a very much enlarged heart with albuminuria are no indication that the cause of this condition is to be found in a primary renal lesion. This form of hypertension apparently begins as a general condition in the vascular system, and the lesion may, or may not, involve the renal vessels. If it does so renal inefficiency soon becomes manifest and the outlook is bad. If the renal system is spared, the prognosis on the whole is decidedly better. Of course, such accidents as cerebral hæmorrhage may occur at any time, but it is noteworthy that many patients go on for a great number of years with hypertension without any cerebral manifestations. In very severe cases cardiac failure may soon bring death, but on the whole the complication most to be feared from the point of view of general prognosis is involvement of the kidneys. In all cases of hypertension it is well to examine the renal function by modern tests. If the renal condition is found to be satisfactory, it may be taken for granted that the outlook is not necessarily bad, but no opinion should *ever be given unless it is certain that the hypertension has existed for some time.* It is my custom to re-examine such patients in about six months after the first examination; if the first examination indicates a satisfactory renal condition, and an examination six months later shows that the kidneys are as efficient as before, then the outlook is much better. Not very infrequently, when the kidneys are examined at an early stage of the hypertension, little or no evidence of renal inefficiency is found, but unfortunately a subsequent examination a few months later may indicate marked renal involvement. When this is the case the outlook is hopeless. On the other hand, if the kidneys do not become involved at a comparatively early stage of the hypertension, they usually escape, or at any rate are not affected to any material extent. Sometimes it is obvious on first seeing the patient that the hypertension must have existed for a considerable time, for evidence of this may be seen in tortuous arteries. In such a case it is certain that the hypertension must have existed for a considerable period, and in these cases very often the renal condition is good. Here we can say at once that, in the absence of accidents, the prognosis is fairly good, provided the hypertension is not excessive and the cardiac condition fairly satisfactory. The following results obtained from two patients with primary hypertension indicate these points:—

No. 1.	No. 2.
Heart much enlarged.	Heart very much enlarged.
1st sound booming.	1st sound loud and somewhat booming.
2nd aortic much accentuated.	2nd aortic accentuated.
Blood pressure = 195/120.	Blood pressure = 210/130.
Renal System, First Examination.	
Urine contained albumin.	Urine contained albumin.
Few hyaline casts present.	Few hyaline and granular casts.
Blood-urea = 25 mg. per 100 c.cm.	Blood-urea = 32 mg. per 100 c.cm.
Urea-concentration test—	Urea-concentration test—
1st hour .. 3·9 per cent. urea.	1st hour .. 2·6 per cent. urea.
2nd „ .. 4·1 „ „	2nd „ .. 3·1 „ „
Condition at Second Examination Six Months Afterwards.	
Heart condition as before.	Heart much enlarged and rate increased. Sounds not so good as before.
Blood pressure = 200/125.	
Blood-urea = 23 mg. per 100 c.cm.	Blood-urea = 92 mg. per 100 c.cm.
Urea-concentration test—	Urea-concentration test—
1st hour .. 3·6 per cent. urea.	1st hour .. 1·3 per cent. urea.
2nd „ .. 3·9 „ „	2nd „ .. 1·4 „ „

In the case of the second patient the first renal examination showed little or no impairment of efficiency, but six months later the picture was quite different. Very marked renal impairment was then present, and a hopeless prognosis was given. The patient died four months later of uræmia and cardiac failure.

In patient No. 1, a medical man, the renal efficiency was quite as good on the second occasion as it was to begin with, and a fairly good prognosis was given. This patient is still alive and apparently enjoys quite good health after four and a half years. The value of renal efficiency tests is well brought out in these cases.

Not infrequently a hopeless renal condition is found to be present on the first examination, and in such a case prognosis is always extremely grave—in fact, the patient generally survives for a few months only. Despite the fact that renal efficiency is found to be unimpaired in many cases of hypertension, it is the opinion of several authorities that all cases of hypertension originate in some sclerosis of the renal arterioles. These observers admit that the renal function may be quite good, even when a very high blood pressure is present, and in order to surmount this difficulty the explanation generally advanced is to the effect that the renal vascular lesion is not sufficiently marked in these cases to interfere with the blood-supply to the glomeruli. This is the view taken by many investigators, especially those of the German school, but it is very difficult to imagine that a renal lesion which is so slight as not to interfere with renal function could possibly produce such marked general cardiovascular disturbances. Often the most severe cardiac involvement accompanied by very excessive hypertension is present in patients whose kidneys are quite efficient. The slight vascular changes found post mortem in the kidneys of such patients are almost certainly the result, and not the cause, of the hypertension. It must be remembered that there is no opportunity to ascertain histological changes in the kidneys until the condition has ended fatally. Under these conditions one would almost expect to find some changes in the renal vessels.

It is interesting to note that even the advocates of a primary renal vascular lesion being the cause of hypertension agree that a few cases are found in which no evidence of vascular changes in the kidneys can be ascertained. It appears to me that this admission strongly supports the view that in hyperpiesis the primary lesion is not in the kidney, but that the disease is a general one with a tendency to involvement of the smaller vessels in any part of the vascular system. It is true that once the condition of hyperpiesis is established the kidneys may become rapidly involved through degenerative changes in the arterioles, but not infrequently the vessels of other organs, such as the spleen and pancreas, may suffer. It is just a chance whether or not the renal vessels do become involved, though there seems to be a greater tendency for the kidney to be attacked than is the case with other organs.

In view of what has already been discussed under acute nephritis, it is possible that some cases of hyperpiesis may originate in a transient temporary lesion of the kidney, but if so, this lesion often clears up and no sign of its presence can be found when the hyperpiesis manifests itself. The question of hypertension is an extremely interesting one on which but little light has yet been thrown, but it appears to be fairly certain that many severe cases of this condition are not essentially associated with any renal lesion.

ULCERS OF THE LESSER CURVATURE OF THE STOMACH.

BY H. W. CARSON, F.R.C.S.

CHRONIC gastric ulcer as it is seen by the surgeon—that is, the ulcer with a comparatively long history—is confined to a small area of the stomach wall. It occurs at or near the pylorus and along the lesser curvature. It is unknown on the greater curvature, and if it involves the anterior or posterior wall of the

body of the stomach it is generally due to extension from the lesser curvature. Ulcers near the pylorus have different symptoms and require different treatment from lesser curvature ulcers, and it is to this latter group that I shall confine my remarks.

There is no generally accepted explanation of the causation of gastric ulcers. There are many theories, and much experimental work has been done, but the puzzle has not been solved. The infection theory, that ulcers arise as the result of some blood-borne infection reaching the stomach from some more or less distant focus, is widely held, and it has had the effect of making the clearing-up of obvious sepsis —e.g., in the teeth, tonsils, or nose—a necessary preliminary for all treatment of indigestion. During the course of the operation, too, the surgeon always looks for coexisting disease in the appendix and gall-bladder and deals with it as part of the operation. The tendency to recurrence after excision of a lesser curve ulcer is also a point in favour of the suggestion that the ulcer is not purely a local happening.

Two Types of Ulcer.

The usual type is a sharply cut ulcer with much induration, which has a tendency to penetrate through the stomach wall. It does not, however, perforate into the peritoneal cavity, because it causes a protective thickening of the gastro-hepatic omentum, which seals it off. Later on the base of the ulcer may become adherent to the liver or pancreas, and these organs become eroded in a characteristic manner, the depression in the pancreas being egg-cup shaped —that is, its depth is almost equal to its diameter— while the depression in the liver is spoon shaped—that is, its surface is greater than its depth; occasionally both pancreas and liver are eroded by the same ulcer. The other type of ulcer extends superficially rather than deeply, and tends to involve the posterior surface and sometimes the anterior surface of the stomach. To this the name of saddle ulcer has been given. Both these ulcers may give rise to hour-glass stomach, a complication due to scar-tissue contraction resulting from the healing of the ulcer, and this hour-glass constriction may exist with an ulcer, either healed or breaking down again—a very important point when it comes to treatment. Ulcers may be multiple, and it is fairly common to find a pyloric ulcer coexisting with an hour-glass stomach.

Ulcers of the lesser curvature occur much more often in men than in women (my own figures are 5 : 1) and are seen by the surgeon, often after a long history, generally during the decade 45–55. The history is rarely less than two years and generally more than five, which contrasts strikingly with the history of cancer of the stomach, in which patients come to the surgeon generally within three months of the onset of the symptoms.

Symptoms.

The symptoms of a simple ulcer of the lesser curvature are often so characteristic that it may be possible to make a diagnosis on these alone.

1. *Pain* is the most important symptom, and it is this that brings the patient to his doctor in the great majority of cases. It is situated high up in the epigastric angle and sometimes is even retrosternal. It comes on about one and a half hours after food and is practically never relieved by food. In most cases relief is obtained by belching wind, and all cases are relieved by vomiting. At first the pain is intermittent; indeed, there may be definite intervals of complete freedom from pain—not so long as in duodenal ulcer, but still, lasting for a few weeks. The intervals become shorter, and when the gastro-hepatic omentum is implicated, or when the liver or pancreas become adherent, pain becomes more or less constant. It is at this stage that a typical pain in the back occurs, at about the level of the twelfth dorsal and first lumbar vertebræ. This is most marked when the ulcer has eroded the pancreas, but I have noted it in many cases where only the gastro-hepatic omentum was thickened. It generally means that a real crater ulcer is present. Pain now occurs both by night and day, though in the early stages night pain is unusual, thus differing from duodenal ulcer.

2. The next prominent symptom is *vomiting*. This occurs in about 70 per cent. of cases and is of the irritation type—that is to say, it occurs every day, and perhaps more than once a day, in contrast to the type of vomiting seen in pyloric obstruction. It is small in amount and consists of mucus and saliva.

3. The third most constant symptom is *loss of weight*. This is the rule and has been noted in practically all my cases. It is probably due to many causes, of which semi-starvation resulting from a restricted diet, the constant pain, loss of sleep, and the loss of fluid by vomiting are the chief.

Hæmatemesis is not at all common, but if it does occur, and especially if in large quantities, it is a very serious symptom, as it may mean that a large artery has become exposed in the floor of the ulcer. The appetite remains good, but the patient dare not satisfy his hunger because of the pain which is certain to follow.

Confirming the Diagnosis.

The diagnosis is confirmed by two methods of investigation, a chemical examination of the stomach contents before and after a test-meal, and X ray examination after a barium meal. Of these there is no doubt that the X ray examination is by far the more valuable, and, indeed, so variable are the results of the chemical examination from day to day that one is placing less and less reliance upon it. But the X ray examination is of the greatest value, and so accurate has it become that over 90 per cent. of lesser curvature ulcers can be correctly diagnosed. Not only can the exact position of the ulcer be determined, but its degree of fixation, its attachment to the liver or pancreas, and the presence of such a complication as hour-glass stomach are plainly shown. To know the exact position of the ulcer is most important, because the site of the ulcer may have a direct bearing upon the treatment adopted, since ulcers high up near the œsophagus are not well-adapted for surgical interference. On the other hand, if the ulcer proves to be a large crater ulcer, adherent to a neighbouring viscus, then we know that there is little chance that anything short of a surgical operation will cure it. An interesting point brought out by the X rays is the occasional occurrence of cardiospasm in cases of high lesser curve ulcers, and the œsophageal dilatation may be the cause of the retrosternal pain some of the patients complain of.

Examination of the abdomen does not often give much assistance. The ulcer is so high up under the liver, and so adherent, that it cannot be palpated even by the excellent method of examining while the patient is breathing deeply. Sometimes there is a tender spot in the mid-line, high up in the epigastric angle, and sometimes there is a relative rigidity of the upper rectus abdominis, but it is all rather indefinite. One must rely for a diagnosis on a correct interpretation of the history and symptoms and the confirmatory evidence of the X rays.

Treatment.

The whole question of treatment is governed by the belief or disbelief in the implantation of cancer on chronic ulcer in this region. In spite of all that has been written or said on this subject we do not yet know, but many surgeons are convinced that cancer does supervene on chronic gastric ulcers in a proportion of cases. My own belief is that it happens, but that it does not happen very often. The great majority of cases of cancer of the stomach that I see have a short history, about three months on the average, and there is little doubt that in such cases the cancer is a new formation. But the mere fact that one is convinced that an occasional case may occur makes one suspect every case and plan its treatment with this idea constantly in view. It comes to a question of what may be called the direct versus the indirect attack.

By the *direct attack* I mean an operation designed to remove the ulcer, and under this heading one includes excision by knife or cautery, with or without

gastro-jejunostomy, or some form of partial gastrectomy, whether it be a sleeve resection, Billroth ii., or Polya.

By *indirect attack* I understand the adoption of methods designed to promote the healing of the ulcer, and this will include such varied methods as duodenal feeding through the duodenal tube, or the performance of gastro-jejunostomy or of a jejunostomy. The supporters of the direct attack have to convince themselves that the operation carries with it a sufficiently low mortality to be justifiable, and that recurrence of the ulcer is a sufficiently remote contingency. The supporters of the indirect attack have to convince themselves that their method will cure a high percentage of cases, that the immediate mortality is low, and that recurrence is rare.

Direct Attack.

Holding as I do the belief that a proportion, though a small one, of chronic ulcers become malignant, I am bound to support the direct attack, but before I suspected the connexion I had abandoned routine gastro-jejunostomy because this operation, which we all used to do in the early days of gastric surgery, did not cure enough of my cases where the ulcer was distant from the pyloric sphincter. My first modification was to do a local destruction of the ulcer, either by excision with a knife or burning out with a cautery, but I found a high rate of recurrence. Then I combined excision with gastro-jejunostomy and got better results. Then I did sleeve resection on suitable cases and was well satisfied with my results, but could find comparatively few cases suitable for the operation. Then I adopted the Billroth ii. method, but found it better suited for ulcers near the pylorus than for lesser curve ulcers. For the last few years I have been doing resection by the Polya method more and more, and I have found the results most satisfactory. In chronic ulcer the immediate mortality is about 5 per cent., the convalescence is peculiarly smooth and uneventful, and so far I have not had any ulceration occurring at the stoma suture line. If the ulcer is small, and I do not feel justified in sacrificing a large extent of healthy stomach, I do an excision and gastro-jejunostomy.

Indirect Attack.

I gave up gastro-jejunostomy as a routine because I did not get good enough results in my lesser curve ulcer cases, and in the last few years I have operated on many cases of persistent or recurrent ulceration after gastro-jejunostomy, some even causing perforation. I agree that the operation carries with it a very low mortality, perhaps 1 per cent., but its failures are too numerous in spite of many brilliant successes to recommend it as a routine. Duodenal feeding and jejunostomy are in the experimental stage. Both are designed with the idea of putting the stomach at rest, though the presence of the tube in the case of duodenal feeding rather militates against this.

Several questions have still to be answered, of which two are most important: (1) How long should the artificial feeding be maintained? and (2) Will the ulcer remain healed? The answer to the first question depends, of course, on the extent of the ulcer and the fixation of its base. It used to be said that 18 months were required to ensure healing, but I feel sure the tendency has been to go on too long. At a meeting of the Medical Society of London last January, Mr. J. E. H. Roberts showed a specimen of an ulcer adherent to the pancreas, which had healed in five weeks, and I showed one eroding the pancreas which had healed in 13 weeks after jejunostomy. The present method in duodenal feeding through the duodenal tube is to maintain artificial feeding for three weeks only, and 50 per cent. of cures are claimed. We shall know more about this matter, and also about the permanence of the cure, in a few years' time, but I feel that there may be a future for both these methods.

Complications.

There are two complications of lesser curvature ulcers which should be mentioned: (1) hæmorrhage, and (2) hour-glass stomach.

Hæmorrhage is a grave complication and one where the surgeon must keep a very cool head. It is difficult to estimate the correct time for intervention, and here a close coöperation with one's medical colleague, valuable at all times in gastric surgery, is absolutely imperative. The tendency is to operate, not too soon, but too late, but I do not mean to infer that surgery is the method of choice in hæmorrhage. Far from it, indeed, for an operation if it has to be done must necessarily be a severe one, for some form of direct attack is essential, and it will be done necessarily on a patient who is a poor surgical risk. At a discussion held at the Royal Society of Medicine a few years ago there was a general agreement that while 4 per cent. represents the mortality of gastric hæmorrhage treated medically, the mortality after operation was nearer 40 per cent., due doubtless in many cases to delay. I do not, of course, suggest that these cases were all chronic ulcers, nor do I believe that 4 per cent. would represent the mortality in hæmorrhage from *chronic ulcer* treated medically. Three steps should be taken in every case of hæmorrhage from a chronic ulcer: (1) estimate the hæmoglobin; (2) group the blood; (3) arrange for a donor for transfusion. If the hæmoglobin is reduced to 30 per cent. operation is practically certain to be fatal, even if transfusion is done. But transfusion has undoubtedly improved the chances of successful surgical intervention.

Hour-glass Stomach.—This may arise in the course of a chronic simple lesser curve ulcer. It gives rise to severe symptoms, vomiting and wasting being the most important. I would lay down one rule in the surgical treatment of this condition. In no case where active ulceration is going on may any indirect method be adopted. If the ulceration is healed, well and good. There is a wide choice of methods, nearly all of which will give good results. Some form of plastic operation on the isthmus may be used, or the cardiac and pyloric sacs may be anastomosed (this is probably the best), or a gastro-jejunostomy may be done into the cardiac sac, or a gastro-jejunostomy into both sacs. One word of caution is necessary. In many of these cases there is a second ulcer causing pyloric obstruction, and in such a case no purely plastic operation on the stomach is permissible. If the ulcer is active, if it is malignant, and in certain cases of healed ulcer, a partial gastrectomy is the correct procedure, and in my experience has generally proved technically easy. I have done sleeve resection in a few cases with free pylorus, but as I said before, suitable cases are not very common.

Summing-up.

1. Gastro-jejunostomy is not a curative operation where the pylorus is unaffected.
2. Excision by knife or cautery is often followed by recurrence and should not be done.
3. Excision with gastro-jejunostomy gives a fair measure of success, but may be more difficult to do, and more trying to the patient than partial gastrectomy. It should be confined to small non-adherent ulcers.
4. Sleeve resection is a good operation, but is practicable in only a small proportion of cases.
5. An ulcer eroding the liver or pancreas should, if possible, be treated by partial gastrectomy.
6. Jejunostomy or duodenal feeding may prove to be a valuable method of treating ulcers so high on the lesser curvature that direct attack is technically impossible.

THE PERMANENT TRACHEOTOMY TUBE.

BY SIR STCLAIR THOMSON, M.D., F.R.C.P., F.R.C.S.

IT is an interesting observation that tracheotomy, though an established operation of surgery for over 2000 years, is often undertaken with reluctance, is frequently delayed until its execution becomes difficult and even useless, and in its performance is not uncommonly imperfect or unsatisfactory. The justification of these criticisms would require more time

than can be given, but it is necessary to mention them before discussing, as I propose to do, the equally interesting observation that once a tracheotomy has been performed, and urgent symptoms relieved, many surgeons and laryngologists display an unreasonable and unwarrantable haste in attempting to dispense with the cannula.

Objections to a Permanent Tracheotomy Tube.

Many reasons are advanced for getting rid of a tracheotomy tube as soon as possible. Perhaps the chief one is that it is not "natural" to inspire the outside air directly into the trachea, instead of having it first warmed, moistened, and filtered by drawing it through the nose. As a consequence it is asserted that the cold and dust-laden air will inevitably damage the lower air-passages and the lungs, causing bronchial, pulmonary, and other troubles. Amongst other objections raised against the permanent wearing of a tracheotomy tube are interference with speech, local discomfort, and social disability.

Nasal Respiration.

No one has more regard than I have for the importance and value of nasal respiration. I may be pardoned for justifying this by referring to my own researches (with R. T. Hewlett) on the defensive mechanisms of the nose [1] and on micro-organisms in the nasal cavities.[2] My observations further confirmed the value of nasal respiration as elucidated by Greville McDonald [3] and others. Our conclusions that, under normal conditions, inspired air in its passage through the healthy nose, before it has reached the lungs or even the larynx, is warmed, saturated with moisture, and sterilised, are now universally accepted.

But this nasal respiration, though the physiological and desirable route, is not always possible permanently. It is particularly important to safeguard it in the growing child and, fortunately, we are able, by attention to adenoids, tonsils, and other conditions, to retain it or restore it before secondary effects to the developing body have resulted from nasal stenosis. In the adult, however, absence of an adequate nasal air-way is by no means so important. I agree with the epigram attributed to an American colleague that "man is the only animal that breathes through his mouth, and he is a fool when he does so." Still, as man does not breathe through his mouth willingly—for nasal respiration is instinctive and mouth-breathing is an acquired habit—it need not be counted to him for foolishness. Once an individual has grown to man's estate, the onset of nasal stenosis and consequent mouth-breathing does certainly reduce the protection supplied by free and healthy nasal cavities. But when symptoms, in the adult, are often attributed to nasal lesions, they are more frequently due to the accompanying sepsis than to mere stenosis.

Nasal Respiration in Children and Adults.

Nature is full of compensations. The individual who carries on most or all of his respiration through a tracheotomy opening is doomed—so say the enthusiasts of nasal respiration—to suffer and die an early death in consequence. If the individual is a child I agree as to this being a possibility above the average. The young human is certainly more prone to respiratory catarrh than the adult; his unused nasal and pharyngeal cavities, from want of use, will not develop fully; his larynx, from disuse, will not expand; his defect or loss of voice handicaps his education; and his inability to mix freely with his fellows, in school and in games, is a serious hindrance to his evolution.

But in the adult some of these drawbacks do not exist and others are much less urgent. The body has attained full growth; education is completed; any voice defects are due to laryngeal or other lesions and not to the presence of the cannula; whilst local discomfort in the neck (i.e., a pain, discharge, the need of dressings, frequent cleansing and changing of the tube) is entirely absent in a well-planned tracheotomy. Social disability hardly exists. Except that a patient who has to depend on a tracheotomy tube cannot enter the water or swim, I know of no serious social disadvantage entailed by its presence. I will relate the cases of patients who can cycle, dance, play tennis or golf, indulge in winter sports, get married and beget children, who are what the French call *canulards*—individuals compelled to wear a tracheotomy tube indefinitely. One healthy old lady of 87 whose case is on record,[4] has worn a tube for 70 years; she had seven children and never had bronchitis. In another case the patient died of senile decay at the age of 81, after wearing a tube for over 50 years.[5]

Nature of the Operation.

I venture to suggest that, amongst other reasons, the two following may explain why such records are not more plentiful. The first is that many tracheotomies are incorrectly performed; the tube is not uncommonly introduced through the first ring of the trachea and the cricoid cartilage, or through the cricoid and crico-thyroid membrane, or even through the latter and through part of the thyroid cartilage. As a consequence there is much catarrh and irritation in the larynx, the soft structures abundant in the subglottic area (and absent in the trachea) are infected; perichondritis may be started, and septic bronchitis is a frequent sequela. Another reason is that ill-considered operative measures to dilate a stenosed larynx (so as to cure a *canulard*) not infrequently result in death. When a tube has to be worn permanently the tracheotomy should be performed as low as possible in the neck and always below the first three rings. In this situation—with the opening in the trachea just above the upper margin of the sternum—a cannula is easily concealed, does not interfere with the movements of the neck or larynx, does not damage or irritate the larynx, and never sets up perichondritis.

There is no excuse for leaving a patient permanently with a high tracheotomy. If the operation is an emergency one, or carried out in haste without proper assistance and surroundings, it is, of course, easier to plunge a knife through a prominent cricoid cartilage, or the superficial first ring of the trachea, than it is to make a dissection lower down the neck of the more deeply situated windpipe. Indeed, in certain circumstances it may be quite the right procedure to save life. But once this is accomplished, and it appears that a tube may have to be worn indefinitely, then a second tracheotomy should be performed lower down in the neck and the higher opening should be allowed to close.

In many instances the laryngeal condition calling for a tracheotomy can be removed, or a resulting stenosis of the glottis can be cured, and the tracheotomy tube is then abandoned with safety. Amongst such conditions I need only mention impacted foreign bodies, acute laryngitis, œdema of the larynx, diphtheria, typhoid, syphilis, and tubercle. In many cases, however, the laryngeal stenosis is permanent, and attempts to remove it may sometimes fail and entail further damage or complete loss of voice, while in other cases surgical traumatism may only scar the neck, stimulate further stenosis, or encourage recurrence of arrested disease. Many methods of overcoming laryngeal stenosis, such as laryngotracheostomy, are tedious, painful, often unsatisfactory, and not free from danger to life. The alternative—the permanent wearing of a cannula in a well-executed opening just above the sternum—is, in adults, not incompatible with a long, healthy, and useful life. It will often preserve a useful voice while avoiding a mutilating excision of the larynx.

Illustrative Cases.

I have not made out anything like a full record of cases in my practice to justify this thesis. But I append short notes of some ten typical cases of

[1] THE LANCET, 1896, i., 86.
[2] Med. Chir. Trans., 1895, lxxviii.
[3] Respiratory Functions of the Nose, London, 1889.
[4] R. Woods: Brit. Med. Jour., 1925, i., 733.
[5] W. A. Berridge: Ibid., 1912, i., 816.

patients who are permanent *canulards* as a result of a variety of conditions. These include (1) complete bilateral laryngeal paralysis, (2) stenosis from surgical trauma, (3) syphilis, (4) lupus, (5) tuberculosis, (6) enchondroma of larynx, and (7) epithelioma of larynx.

CASE 1.—*Complete Bilateral Laryngeal Paralysis.*—A girl of 20 was operated on, in the provinces, for a goitre and presented herself at King's College Hospital in March, 1923, with marked stridor, even when at rest, and complete bilateral abductor paralysis. A good low tracheotomy was performed under local anæsthesia. Her weight, which had fallen to 104 lb., has now returned to 123 lb. Her voice is good. She works hard in a factory. The tube is easily concealed by her dress and causes her no disability. She has worn it for four years and has never had a day's illness. No bronchitis, catarrh, or other trouble can be attributed to it.

This case is well worth noting and comparing with the many operative attempts which have been made to correct the laryngeal stenosis caused by bilateral laryngeal paralysis. These attempts have rarely, if ever, been successful in the human being. As a rule they have entailed long, trying, and painful treatment, leaving the disappointment of a much scarred neck and deterioration or destruction of the voice. In not a few cases they have been followed by death.

CASE 2. *Stenosis from Surgical Trauma.*—(After laryngofissure for intrinsic cancer followed by wearing of a tube for eight months and then laryngostomy.) A man, aged 47, consulted a colleague abroad for a mammelated growth of the right vocal cord. Biopsy revealed an epithelioma. Laryngofissure was performed under local anæsthesia on July 8th, 1920, with "destruction of the neoplasm with the thermo-cautery." A tracheotomy tube was left in place for nearly six months. The larynx closed up almost completely and laryngostomy was performed on Oct. 3rd, 1920, and dilatation with rubber tubes was maintained until the Dec. 27th.

I saw him for the first time five months later. Both vocal cords were fixed, leaving only a much reduced glottic chink. There was no evidence of disease. The immobility of the cords was presumably due to subglottic cicatricial retraction. Under local anæsthesia a low tracheotomy was performed. The rings, through which the cannula was introduced, had evidently not been incised in any other operation. The relief to the patient has been remarkable. He has been able to resume golf, playing two rounds a day. His voice is louder and stronger than before the tracheotomy. Being low down in his neck the cannula is easily concealed and he declares he would not like to be without it. He has now worn it for seven years.

CASE 3. *Syphilis.*—In 1899 I performed tracheotomy on a woman of 34 for stridor and suffocative attacks caused by laryngeal stenosis from syphilis, for which I had been seeing her for two years. I saw her 20 years afterward, in 1919, when I found her weighing 154 lb. and looking in robust health. She reported that she could dance and play tennis; was never subject to bronchitis. She had two healthy children, aged 18 and 19.

CASE 4. *Lupus of Larynx.*—A lady, aged 33, had lupus from the age of 5, with prolonged and varied treatment. Tracheotomy was done in 1916 on account of urgent laryngeal stenosis. The tube has now been worn for 11 years, during which time she has married and has a healthy child aged 9. There has been no appearance of lupus on palate, gums, cheeks, pharynx, or larynx for past four years.

When she is sitting still the laryngeal air-way is abundant, so she corks up the tracheotomy cannula at meals. She can even walk about with the tube closed, but as she is an enthusiastic dancer, skater, and lawn-tennis player she prefers the superaeration supplied through the opening in her neck. Her voice is strong and clear. The cords have regenerated and are free and mobile. The stenosis is in the aditus ad laryngem, caused by scarring and contraction of the epiglottis and aryepiglottic folds. It might be possible to dilate this, but patient declines any effort which would part her from her tracheotomy tube. She remembers with horror the increasing dyspnœa she suffered during the year before she would accept my advice of a tracheotomy. The tube is so easily concealed by chiffon and gauze that not one of her dancing partners—even, as I have tested, when they were laryngologists—has detected its presence. It causes her no social inconvenience, except that she cannot enter a swimming bath! She never gets bronchitis and states that she has fewer colds than most people.

Tuberculosis of the Larynx.

CASE 5.—A woman, aged 42, had tuberculosis in her lungs and larynx for two years before admission to King Edward's Sanatorium, Midhurst, in June, 1923. Her appendix had been removed for tuberculosis. There were T.B. + in sputum, and both lungs were affected. There was ulceration of both cords and the right side of the larynx was fixed from a large, extensive deposit in the right ventricular band and the right arytenoid. Under silence and the galvano-cautery, with sanatorium treatment, the larynx was healed in a year (by June, 1924). But the right cord remained fixed, and healing was followed by so much scarring and contraction that the glottic space was reduced to a chink. She had dyspnœa on the slightest exertion and could not go upstairs. On Oct. 22nd, 1924, a low tracheotomy was performed under local anæsthesia. She has worn her tracheotomy tube for nearly three years. She weighs 14 lb. more than when she came to the sanatorium four years ago. She has had no set-backs, can walk several miles, seldom rests through the day, and gets through a lot of domestic work. Her sputum is negative. Her voice is good, but the glottic chink is quite inadequate for ordinary respiration.

CASE 6.—A woman, aged 32, was admitted to the sanatorium in September, 1911, with T.B.+ in the sputum, disease in the right lung, and a large tuberculous deposit in the interarytenoid region. She had a long course of tuberculin and sanatorium treatment, but healing only took place after 18 applications of the galvano-cautery between August, 1912, and May, 1917. The larynx has, since this last date, remained soundly healed, but contraction of the scar tissue in the larynx very gradually took place and, at the end of five years (i.e., in October, 1922) a tracheotomy was required.

Her pulmonary trouble is quite arrested. She can walk for miles and climb stairs, and easily carries on her occupation as mistress of a country post office. It is 16 years since her larynx was healed and she has worn a tracheotomy tube continuously for nearly five years. It gives her no inconvenience.

CASE 7.—A man of 29 was sent to me in January, 1926, for "laryngeal paralysis." For 18 months he had had symptoms and for some weeks his sleep had been fitful, owing to laryngeal stridor, yet his case had not been diagnosed. He had tuberculosis with T.B.+ in the sputum. The glottis was reduced to a mere chink owing to a grey, irregular, cauliflower infiltration of both vocal cords and a large cauliflower subglottic growth. This appeared to spring from the left side, which was quite fixed. Tracheotomy was performed under local anæsthesia and he was sent to a sanatorium.

When next seen, ten months later (October, 1926), he was free from stridor and had such a wide open glottis that he breathed quite freely when the tube was blocked. The cauliflower growth had disappeared and both vocal cords had completely healed and were intact. He could only talk in a whisper and it was seen that this was due to his inability to adduct the cords and close the glottis, owing to partial fixation of the arytenoid joints. This is doubtless caused by deposit and healing of tuberculous deposits in the subglottic areas, as some ulcerating granulations were visible below the posterior half of each cord. This remarkable improvement has taken place although X rays show intense infiltration all over both lungs with some breaking down in upper and middle zones. Tubercle bacilli are still present in sputum. His weight is 169 lb. and he can walk several miles, but it will still take some time to secure complete arrest of the pulmonary disease. Perhaps before that takes place we may abandon his tracheotomy tube. But its continuance can do him no harm and its adoption has saved his life.

CASE 8. *Chondroma of the Larynx.*—A patient in 1914 began to experience failure of voice. Tracheotomy was "contemplated" but not carried out until he had been well treated for a conjectured diagnosis of syphilis. Tracheotomy had to be performed "in haste" in 1916. In 1920 Mr. E. B. Waggett diagnosed and removed a chondroma of the cricoid, leaving a tracheotomy tube in situ. The growth recurred. I saw the patient in consultation in 1923 and Mr. Waggett again operated in March of that year. The patient has remained well since, speaking with "a very passable voice," able to conduct "without discomfort" his official duties as a consul, and wearing a valved tracheotomy tube.[1]

Intrinsic Carcinoma of the Larynx.

CASE 9.—(Laryngofissure followed in eight months by hemilaryngectomy. Tracheotomy tube worn for seven years. Active life. Strong voice.)

A woman, aged 41, was hoarse for three years before presenting herself at the early age of 33 with epithelioma

[1] E. B. Waggett: Jour. of Laryn., 1921, No. vii., 338, and 1925, No. i., 27; StClair Thomson: Jour. of Laryng., 1925, No. i., 1.

invading the entire right vocal cord. The diagnosis was confirmed by biopsy. Although the pathologist (A. K. Gordon) expressed opinion that the growth was highly malignant, it was decided, in view of the limitation to cord and the free mobility of the latter, to first attempt a cure by laryngofissure. When this was performed on August 5th, 1919 (eight years ago) it was noted that the growth extended close up to the margin posteriorly. Within four months there was a suspicion of recurrence, but she did not present herself again until four months later, when the right half of the endolarynx was fixed by growth. On May 7th, 1920, through a lateral pharyngotomy, the right half of the thyroid and cricoid were removed by Wilfred Trotter and skin flaps folded it in to make a fresh lining to that side of the larynx. But the lumen of the larynx is not sufficiently large for free respiration, so she has now worn a tracheotomy tube for seven years. Her voice is loud and strong, though rough. She thinks nothing of a walk of six or more miles, and during these years has never missed a full day's work in a pottery where she earns a good livelihood. She weighs 105 lb., never has bronchitis, and the tube, which is taken out and cleaned every eight or ten weeks, causes her no inconvenience. She never has bronchitis.

CASE 10.—(Laryngofissure on one cord 11 years ago. Regrowth on opposite cord seven years afterwards. Second laryngofissure. Tracheotomy tube worn for four years. Good health, useful voice.)

A lady, aged 46, was hoarse for 18 months before being operated on in August, 1916, for epithelioma invading all the right vocal cord, which was sluggish in movement. The diagnosis was confirmed by biopsy. She remained free from disease, in excellent health, with a voice quite as good as when she presented herself before operation, and was able to gain her livelihood as a companion with a fair amount of reading aloud as part of her duty. After seven years of healthy and useful life, during which she neither wore a tracheotomy tube nor had other disability, she returned with a nodular, cauliflower, dimpled growth on anterior half of the left (the opposite) cord. For this the patient underwent her second laryngofissure on Dec. 6th, 1923.

She has worn a tracheotomy tube permanently since then. Nearly four years have passed. In her larynx one sees two cicatricial cords. The right one is quite fixed (the original cord was removed in its entire length), but the left moves fairly well and allows of some voice. The glottic space —although, naturally, much reduced after a double laryngofissure—is quite adequate for respiration, and when the patient is sitting still she corks up the tracheotomy opening and, at meals for instance, can carry on conversation in a low rough whisper without any embarrassment. But, as the air-way is not sufficient for active life, she can work and walk about with the silver cannula concealed in her neck, still fulfilling her duties as a companion. The tube is only taken out for cleansing purposes every three months. There is no mucus or discharge around it. She gets no winter cough. She has never had bronchitis.

How much healthier, happier, and more useful are these two women than they would have been had the entire larynx been excised! They have suffered no harm and but little inconvenience from wearing a tracheotomy tube for, respectively, seven and four years.

HOSPITAL COÖRDINATION AT SHEFFIELD.—An advisory committee has just been formed, the object of which is to bring about closer coöperation and coördination among hospitals in an area within 25 miles of Sheffield and to develop their efficiency. The scheme includes four hospitals in the city with 1050 beds and eight outside with about 700 beds. Autonomy will in no way be affected, nor will the functions of any voluntary hospitals' committee be interfered with.

THE LATE DR. JAMES M. WILSON.—Dr. James Mitchell Wilson, late medical officer of health of the East Riding of Yorkshire, died at Beverley on May 29th at the age of 83. He was born at Perth and was educated at the Dollar Academy and at the University of Glasgow, where he graduated in 1867. After a period of practice at Chatteris he decided to take up public health work, and in 1877 took the D.P.H. at Cambridge. Five years later he proceeded to the M.D. degree at Glasgow. He held the appointments of medical officer of health for Doncaster Borough and for Rochdale Borough and went to the East Riding in 1901. He was also a past president of the East Yorkshire branch of the British Medical Association. Among his publications was a Note-book for Inspectors under the Dairies and Cowshed Orders. He leaves a widow and three sons.

GENERAL MEDICAL COUNCIL.

SUMMER SESSION, 1927.

(*Concluded from p. 1202.*)

APART from the hearing of charges against professional conduct, reported in our last issue, a few matters of more general interest came before the Council.

An Incorrect Entry in the Medical Register.

The Council held an inquiry into the circumstances under which the name of John Richard Brinkley had come to be entered in the Register, and whether or not the entry was incorrect. Mr. Brinkley was a resident of the United States who lived at Milford, Kansas, and qualified at the Eclectic School there. Wishing to qualify for the English Register, he had gone to Italy, where reciprocity with this country existed, and had passed the examinations which entitled him to the degree of M.D. Pavia in 1925. He had not studied in Italy, but his American qualification had been accepted. Subsequently, however, the registration authorities at Rome had cancelled his Pavia degree, on the grounds that they were not satisfied that the standard required by the Eclectic School was adequate to entitle a graduate of that body to practise in Italy. Therefore, said the Council's solicitor, the entry was incorrect and could not be allowed to stand, but he had no intention whatever of suggesting that Mr. Brinkley had acted in any way that was not completely above board. The Council decided to erase the entry, finding that it had been made upon information tendered in good faith, but now ascertained to be incorrect. They directed that the registration fee be returned to Mr. Brinkley.

Covering Uncertified Persons Practising as Midwives: Alteration in Warning Notice.

On the recommendation of the Executive Committee the Council decided to amend the Warning Notice regarding association with uncertified persons practising as midwives to read as follows:—

7. Whereas it has been made to appear to the Council that certain registered medical practitioners have from time to time, by their countenance or assistance, or by issuing certificates, notifications, or other documents of a kindred character, enabled uncertified persons to attend women in childbirth otherwise than under the direction and personal supervision of a duly qualified medical practitioner contrary to law; and whereas such conduct is in the opinion of the Council discreditable to the profession of medicine, and calculated to defeat the purpose of the Statutes made in the public interest for the protection of mothers and infants; notice is hereby given that any registered practitioner who is proved to have so offended will be liable to have his name erased from the Medical Register.

Committees and Other Business.

The Council directed the Registrar of the Dental Board to restore to the Dentists Register the name of Samuel Robertson Crosbie on fulfilment of the prescribed requirements.

The English Branch Council, which met on Wednesday, appointed Mr. Robert Milne, F.R.C.S., an assistant examiner in surgery to the Apothecaries' Society of London for a period of five years.

The Chairman of the Finance Committee, Sir Holburt Waring, reported a surplus for the year 1926 of £5267 12*s.* 1*d.* The total number of registrations was 1947, as against 2569 in 1925 and 2796 in 1924.

The Education Committee have completed the draft of their report on the progress made throughout the country towards the readjustment of the medical curriculum in accordance with the resolutions of the Council adopted on May 26th, 1922. They hope to present the completed report to the Council at the November session.

The Council learned with regret the decision of Dr. J. T. Mackay to resign from his appointment as chairman of the Education Committee.

The Chairman of the Examination Committee, Sir Norman Walker, reported that the number of candidates for examination fell in 1926 to 2273, a figure only slightly higher than that for 1913. No report would be issued on the working of the simultaneous pass in anatomy and physiology until the Committee had further information.

Mr. Norman C. King was unanimously re-elected Registrar to the Council.

MEDICINE AND THE LAW.

Expert Evidence and the Length of Trials.

SOME months ago Mr. Justice Tomlin proposed to make a rule that in future the number of expert witnesses to be heard in any case before him should be limited to two from either side. He was trying a claim made by a colliery company against the Swansea Corporation, it being alleged that the defendant body in filling one of its reservoirs would flood and damage coal-mines belonging to the plaintiff company. The hearing, which began before last Christmas, actually occupied 60 days, and judgment has just been delivered. After finding for the defendants and explaining his reasons, the learned judge drew attention afresh to the increase in late years of cases involving expert evidence, the greater length of such cases, and the growing elaboration of their preparation. What he described as the "overloading" of the case placed the parties with the lesser resources at a grave disadvantage, as well as delaying the course of general business in the courts. In every case of that kind, observed his lordship, there were generally many irreducible and stubborn facts upon which agreement between experts should be possible. He regarded the expert advisers of the court, whether legal or scientific, as being under a special duty to the court to limit in every possible way the contentious matters of fact to be dealt with at the hearing. He thought that all concerned in litigation of this class must in future, in the preparation of their cases, address their minds more closely to the restriction of the area of dispute.

The hint will not be lost upon medical and scientific witnesses, though it must be remembered that rules of practice appropriate to hearings in the Chancery Division have no necessary application to trials elsewhere. Cases about reservoirs and coal-mines raise questions of geological and engineering facts on which experts may be able to reach some large common measure of agreement in advance of the actual hearing in court. Medical questions such as arise in litigation under the Lunacy Act or in criminal trials cannot so easily be reduced to simple facts and figures. Personal liberty or professional reputation may be at stake, and it may be inevitable that every fact and inference should be keenly contested. Nevertheless, medical witnesses, particularly in accident or workmen's compensation, will always earn the gratitude of the court if they narrow the issues of fact as much as possible and take pains to exhibit matters of agreement as well as matters of dispute. Nothing gives so much strength and independence to an expert witness's opinions as a readiness to admit a point which cannot reasonably be controverted.

If Mr. Justice Tomlin's observations were universally adopted and extended, they would have the effect of converting the expert witness, who at present is employed and paid by either plaintiff or defendant for partisan purposes, into a quasi-judicial officer competent to formulate the issues in the litigation and encouraged to concentrate upon obtaining the maximum of agreement between the two sides. In other words, he would become an assessor of the court, or even a referee. Judges have considerable powers at present of appointing and employing expert assessors; it is sometimes remarked that these powers are too little employed. The court is also fully competent to conduct its proceedings in such a manner as to avoid a case being unnecessarily protracted. In the Swansea Corporation case not all the blame must be put upon the scientific expert witnesses; time could have been saved by the legal experts also.

Alleged Negligence in Removal of Tonsils.

In a recent action in the Ulster King's Bench Division before a special jury, a father claimed £1500 damages for personal injuries to his daughter, aged 6, on the ground of negligence in carrying out an operation at the Benn Hospital last November. The defendant was Dr. I. A. Davidson, a member of the surgical staff of the Benn Hospital, and also of the Ulster Hospital for Women and Children. After evidence for the defence had been given by the defendant himself, Mr. James A. Craig, M.R.C.S., Dr. William Dickey, who had administered the anæsthetic, and Mr. W. M. Killen, senior surgeon at the Benn Hospital, a verdict was given in favour of Dr. Davidson, who was defended throughout by the London and Counties Medical Protection Society.

The plaintiff's claim was that, as the result of the operation for the removal of adenoids and tonsils, his little daughter was unable to take solid food, could not drink in the ordinary way, and developed a nasal intonation in her voice at times. From the evidence it appeared that the adenoids and the left tonsil were cleanly removed, but the right tonsil was found to be adherent; in the attempt to remove the latter the uvula was cut off. Dr. Davidson stated that the operation of removing adenoids and tonsils was one which he had himself performed some 12,000 times and that on this occasion he followed the same procedure and took the same precautions as on other occasions. He said the removal of the uvula was an accident which had occurred to him only twice in his career and might occur to the best surgeons in the world. He claimed that he had given his best skill and attention to the case. In cross-examination he said that he did not know until next morning that the uvula had been removed, and could even now do no more than conjecture the actual moment at which the accident occurred. Negative evidence as to the value of the uvula was given by other witnesses; questions were also asked as to the practice of telling or not telling the parents forthwith when such an accident had occurred. From the legal point of view there are certain accidents in which negligence is *prima facie* assumed; in the legal phrase *res ipsa loquitur*, the facts speak for themselves. This case was not one of these, and, as the jury found that Dr. Davidson had exercised reasonable skill and care in the operation, judgment was entered in his favour.

VIENNA.

(FROM OUR OWN CORRESPONDENT.)

The Action of Hypnotics.

Prof. P. Pick recently addressed the Vienna Medical Society on the subject of hypnotics. Although, he said, the narcosis produced by inhalation is very similar to that which results from hypnotic drugs, the seat of action is different in the two cases. Inhalation generally paralyses first the sensory portion of the cortex, whereas the action of the hypnotics is first directed towards the motor areas and those governing the ocular, labyrinthine and proprioceptive reflexes. Inhalation can, of course, be stopped or controlled at any moment, whereas the narcosis induced by hypnotic drugs only disappears gradually as the drug is disintegrated or eliminated. By experiments on animals in which the cerebral cortex and corpus striatum has been removed, it has been shown that most of the hypnotics—e.g., alcohol, paraldehyde, chloral, urethane, veronal, and luminal—are active in decorticated animals; morphine and scopolamine also cause sleep in thalamic animals.

The point of action of most hypnotics is the brain-stem, but the condition of the cortex is, of course, of great importance, and cortical irritation will prevent sleep unless it is controlled—e.g., by bromides or (experimentally) by severing the connexion between the cortex and brain-stem. Calcium salts excite the cortex and thus interrupt the sleep produced by magnesium, but they have no effect on the decorticated animal. Prof. Pick divides hypnotics into two groups, cortical and thalamic. The first includes alcohol, bromide, paraldehyde, and chloral, whilst derivatives of urea, such as veronal and luminal, belong to the second, together with isopral and chloretone. Morphine and scopolamine work in both ways. The most active hypnotics, he argues, are those which combine the effects of the two groups, their coöperation being termed synergism. It has been shown that combinations such as luminal and scopolamine, or chloretone and paraldehyde, are very effective. Even better results are obtained when urethane and medinal is combined with theophyllin, which facilitates penetration of the tissues.

In the discussion following Prof. Pick's lecture, Dr. Dattner pointed out that the physician should distinguish between disturbance before sleep has begun, disturbance of the sleep itself, and disturbance of the sleeper. The first is often due to mental overwork, to caffeine or nicotine, or to emotional causes. The habit of premature awakening so often seen in aged or neurotic people can be combated by improving the circulation, thus promoting better oxygenation of the tissues. A radical change of diet is often very useful, and it is especially desirable to cut down the supply of the exciting substance calcium.

Restriction of the Number of Medical Students.

The two professors of anatomy in the University of Vienna point out that the number of students applying to them for instruction is far in excess of the number which can be taught in the institutes; in the present summer term there have been no less than 600 applicants, of whom only 148 are Austrians. As little dissection is done during this term it has been possible to give instruction to them all, but difficulties will arise in the winter, for there are not enough subjects for dissection, and the professors suggest that the number of first-year students should be restricted so as to allow those taking the course to dissect all parts of the body at least once. It is only possible to get from the hospitals those bodies which are not claimed by friends, and with the decrease of patients at hospitals and the increase of pious burial societies these unclaimed bodies are getting very scarce. At present the two Viennese institutes of anatomy have only a small stock, and the professors suggest that no foreigners should share in the teaching facilities until a place has been found in the schools for every Austrian. The Senate and the public receive this proposal with mixed feelings. The general opinion is that it would be a mistake, over so small a matter, to endanger the standing of Vienna as the chief university in Eastern Europe. It must be possible, it is felt, to ensure by law that there shall be an adequate supply of subjects for the dissecting room. A large section of the public suspects that the proposal to select a limited number of students is really aimed at the Polish and Hungarian Jews, who flock to Vienna because feeling in their own countries is strongly anti-Semitic.

Medical Graduation in Austria.

During the winter term the three Austrian universities—Vienna, Graz, and Innsbruck—have conferred the degree of M.D. on 427 candidates, entitling them to practise medicine. Of these, 252 were conferred at Vienna, 115 at Graz, and 60 at Innsbruck, and it is interesting to note that the percentage of foreigners was 65 at Graz, 40 at Vienna, and 30 at Innsbruck; 7 came from Egypt, 1 from the United States, 74 from Bulgaria, 7 from Italy, 30 from Poland, 31 from Roumania, 54 from Yugoslavia, and 5 from other countries.

PARIS.

(FROM OUR OWN CORRESPONDENTS.)

Celebration of Two Centenaries.

THE French medical profession has been celebrating two centenaries. It is 100 years since the death of Pinel and the birth of Vulpian and the two events have fittingly been commemorated together, for these two men represent two different epochs. "With Pinel," wrote Prof. E. C. Achard, "there disappeared a medicine which seems to us antiquated—a medicine of mere observation, ignorant of true scientific interpretation because it knew hardly anything of pathological anatomy, of physiology, or of precise ætiology, a medicine devoted to verbal dissertations, to nomenclature, and to classification. With Vulpian arose a generation which was already instructed in morbid anatomy and perfected it by histological investigation, which invoked new knowledge of physiology to interpret pathological processes, and which began to emphasise the rôle of microbic organisms as a cause of disease."

The Prevention of Tuberculosis.

At the recent national congress on tuberculosis, which was held at Lyons, Dr. Léon Bernard and Dr. Poix, of Paris, reported on the care of the pre-tuberculous child, dealing with preventoriums and the placing of children in families, as suggested and carried out by Grancher. The plan is to entrust the children to doctors in the country who choose homes for them among the peasants and give them the necessary care and supervision. On the same basis is the scheme for boarding out the babies of tuberculous parents, of which such excellent results are reported. Whereas the mortality among those who remain in their infected homes is about 80 per cent., the percentage death-rate of those who are isolated from birth is less than six, whilst that of infants already exposed to infection but transferred to better surroundings is only about eight.

Intracardiac Remedies.

In pulmonary diseases drugs given by the mouth are often inactive, those passed into the trachea are largely coughed out, whilst with intravenous injections the place of entry is always so far from the lung that the effect of a massive dose is lost by dilution before the remedy gets to the seat of the disease. On these grounds Cherechewski, Florentin, and Lesbouyries suggest—though it seems a little risky—that medicaments should be injected straight into the right side of the heart, whence they would be carried directly into the pulmonary circulation. Their experimental research on the dog has proved, they say, that the procedure is not dangerous, and they consider that it opens a way to the better treatment of pulmonary tubercle in man and of the same and other infections in animals. They are pursuing their experiments with a view to applying the results tentatively to human beings.

Yellow Fever.

The Académie de Médecine has received a report of the cases of yellow fever observed in French West Africa between July, 1926, and February, 1927. The epidemic began in the British colonies of the Gold Coast and Nigeria. The neighbouring districts of Dahomey and Haute Volta were well protected, and only two cases were reported from each of them; but in Senegal, where the white population lives in close contact with the natives, the number of victims was much greater. The fact that the cases were scattered over an immense area made sanitary measures very difficult. Nevertheless, thanks to immediate and rigorous precautions, the number of severe cases was relatively small (34 cases with 29 deaths). Noguchi's vaccine and serum were used with advantage, whilst efforts to prevent the disease from spreading included the isolation of patients, the destruction of stegomyia in infected houses and those adjoining, the discovery

and clearance of the breeding-places of larvæ, and the supervision of travellers.

Synthalin.

Chabanier and Lebert have recently described their observations on the treatment of diabetes mellitus with synthalin. They have investigated 27 cases of which 19 were severe, and they have come to the conclusion that the remedy is not by itself sufficient for treatment where the condition of the patient is serious. In the dosage needed to get the same results as with insulin the drug generally upsets the mucous membrane of the stomach or intestine, so that its administration has to be stopped. Even where the disturbance is not so great as this the synthalin has a bad effect on the appetite, sometimes abolishing it altogether; at the same time the patient gets thinner and shows an asthenia which is in contrast to the well-being which insulin produces. The suggestion that alternate courses of the two drugs should be given does not seem to have much to recommend it. Synthalin has a good effect on patients with mild diabetes, but here also it is commonly found that it cannot be given at all continuously. In its present form, therefore, the remedy is apparently not of much practical value.

Diphtheria.

The mortality from diphtheria during the outbreaks last January was exceptionally high, ranging from 12–18 per cent. in the non-malignant cases to 50 per cent. in the malignant forms. This mortality was generally due to associated and secondary affections, especially streptococcal and pneumococcal. Empyema, pneumococcal arthritis, and broncho-pneumonia were particularly noticeable. Influenza was likewise an important contributory cause of the mortality.

A method of nasal vaccination against the disease has recently been tested by Lesné and others in a series of 124 children, the Ramon anatoxin being employed. Immunity was judged by the Schick test. The nasal method appeared satisfactory, but the investigators do not recommend it as a general substitute for subcutaneous vaccination.

Intraspinal Analgesia.

A wave of opinion adverse to the intraspinal method of producing analgesia seems to be developing in France, a number of deaths and failures having been recently reported. The method is being advised for occasional use only.

Several cases of iodism following injection of lipiodol into the bronchi have recently been reported from different hospitals at Paris.

A physician in the south of France received, during the process of opening a tube of small-pox vaccine, a droplet in the left eye. Ensuing keratitis, iritis, and iridocyclitis became aggravated, and enucleation of the affected eye was unavoidable. This case illustrates the precautions which should be observed in manipulating small-pox vaccine.

The International Commission on Occupational Diseases, which was formed in 1906, has just been reorganised. Some 17 countries are represented. The secretary, Dr. L. Carozzi, may be addressed at Geneva, Switzerland.

BERLIN.

(FROM OUR OWN CORRESPONDENT.)

Congress of the German Surgical Association.

IN a paper at the recent surgical congress Dr. Rost (Mannheim) said that 10 per cent. of deaths after operation were due to heart troubles. He also drew attention to the danger of operating on patients who have recently had influenza, respiratory complications being very common in those cases. In 1926, he said, pulmonary embolism increased considerably in frequency, for some reason unknown. There seemed to be no reliable means of preventing or curing post-operative pneumonia, but pneumococcal serum and inhalations of CO_2 proved valuable sometimes. As regards preparation for operation it was very important to attend to the bowel, but no strong purgative should be given.

Prof. F. Sauerbruch (Munich) discussed the origin and surgical treatment of bronchiectasis, which was not, he said, a sequel to bronchitis or broncho-pneumonia, as was generally supposed, but was due to congenital cystic dilatation of the bronchi. Eighty per cent. of the lesions in bronchiectasis affected the left lower lobe, this being due to the position of the Cuvier's duct, which hindered the development of the left lung. Bronchiectasis and bronchial cysts might exist a long time, not causing any symptoms until infection occurred. Cure was possible by radical removal of the left lower lobe.

Prof. V. Schmieden (Frankfort) said that in pancreatitis the infection may come from the gall-bladder, from the canal of Wirsung, from the veins, lymphatic vessels, or from a penetrating duodenal ulcer; or it may follow embolism of the pancreatic artery. Infection from the gall-bladder is the cause in two-thirds of the cases, and in cholelithiasis, according to Prof. Schmieden, the gall-bladder should always be removed, cholecystotomy being insufficient because it does not reduce the pressure in the gall-bladder. Apart from necrosis, which sometimes occurs rather early, the dangers connected with pancreatitis are hæmorrhage and acute peritonitis with septicæmia. A correct diagnosis, Prof. Schmieden said, had been made in 40 per cent. of 1510 cases described in the literature. Early operation was nearly always indicated. In cases where the condition at first produced only an œdema of the pancreas, 76 per cent. of the patients were cured by operation. Delay was only justifiable when there was severe collapse or where the surgeon, consulted rather late, found a fairly normal pulse-rate and might decide to wait until an abscess was formed. Where the diagnosis was not quite certain and there were severe abdominal symptoms suggesting pancreatitis, it was undesirable to wait until the full symptoms had developed. The general mortality of cases in which operation was done was 50 per cent. The operation consisted of wide incision of the capsule with drainage; sometimes the gland itself was also incised.

Prof. Paul Clairmont (Zürich) stated that in a series of 1298 cases of appendicitis conveyed to the Zürich Surgical Clinic on behalf of practitioners, the diagnosis was erroneous in 20 per cent. This statement must not be looked upon as a reproach to the general practitioner; on the contrary, it was satisfactory to find that medical men were growing more and more accustomed to have every suspicious case investigated by a surgeon. In 85 of the cases a correct diagnosis was subsequently made at the clinic, whilst in 6 per cent. of those operated on it was found that the disease was not appendicitis. Prof. F. König (Würzburg) said that in doubtful cases the surgeon ought to operate because otherwise practitioners would tend to wait before sending up urgent cases.

Avertin.

Reporting on the new anæsthetic, E. 107, or avertin,[1] Dr. F. Eichholz (Elberfeld) said that it is quickly absorbed, that there are no complaints after narcosis, and that it has no undesirable action on the circulation and the blood pressure. Disturbance of respiration occurs only when double the narcotic dose is administered. Dr. Butzengeier (Elberfeld) said that to obtain narcosis 0·1 g. avertin per kg. of the patient's weight should be given by enema 20 minutes before operation. The patient, as a rule, begins to sleep after a few minutes. If he does not an additional dose, one-quarter of the first, may be administered, but the total amount given should never exceed 0·15 g. per kg. The patient sleeps for three or four hours and does not vomit. Persons with disease of the colon are not suitable subjects. A few drops of ether may be given, if considered necessary, to accelerate the narcosis. Prof. Nordmann (Berlin) offered a warning against producing

[1] THE LANCET, April 2nd, p. 718, and May 14th, p. 1037.

full narcosis with the compound alone; in 40 per cent. of his 250 cases a few drops of ether had to be given to aid its action. Prof. F. Sauerbruch had observed three cases in which avertin caused erosion of the colon with fatal results. Prof. E. Unger (Berlin) recommended that the drug should be dissolved in a mucinous fluid. In about 70 per cent. of cases, he said, the narcosis was successful, but eight patients had symptoms of severe asphyxia. Dr. Melzer (Königsberg) reported that in 100 cases there was no irritation of the colon; on the other hand, there were in this series 18 with cardiac disturbance, four deaths occurring among them. The main drawback to the method is that the dose cannot be regulated during the narcosis, so that the fate of the patient depends on the amount originally given.

X Rays and Childbearing.

In the *Archiv für Gynäkologie* Dr. Werner has published an article dealing with the remote influence of X rays on the offspring of women who have been irradiated. The effect of treating excessive hæmorrhage or fibroids by X rays is, he says, to render first abortions more frequent. Whereas the usual number of abortions is one to every five normal births, the ratio where X rays have been applied is one abortion to every two births. In a series of 22 women pregnant after Rontgen treatment there were 45 pregnancies, of which only 27 lasted to term. Five of the infants died very young and of the 22 that survived one suffered from congenital stenosis of the trachea, one from congenital cardiac disease, one from rickets, one from tuberculosis, and one from general debility. Two-thirds of them had a weight considerably below the normal. It follows, according to Dr. Werner, that X rays have a very unfavourable action on the offspring and that this influence will certainly become more marked in the generation to come. The treatment of pregnant women with X rays is, he says, still more undesirable, many infants being born as idiots or microcephalics.

A committee presided over by Prof. Schilling and Prof. A. Magnus-Levy has been investigating 2820 cases of pernicious or Addisonian anæmia. The features of the disease, it is stated, have not altered, but three times more cases were notified in 1924 than in 1915. The suggestion is made that the war, the blockade, and economic distress have contributed to this increase.

The price of German scientific books is sometimes regarded as excessively high abroad. According to the *American Review for Biology* this idea is mistaken. The average prices for a page in a scientific book may be expressed (in cents) as: in England 1·28, in the United States 1·12, in Germany 1·09, in France 0·35, and in other countries 1·51. The low price of French books is attributed to the state of the French currency.

Public Health Services.

MENTAL HOSPITAL REPORTS.

The *City of London Mental Hospital* at Stone, Dartford, has a remarkably clean bill of health to report for 1926. There was but one case of tuberculosis, and that a latent one, and no dysentery or other epidemic or zymotic disease. For 600 mental patients this is a record that must be hard to beat. Thirty patients died during the year, a death-rate of 4·2. Post-mortem examinations were held in 12 instances. The recovery-rate was 55·8 per cent. These figures do not include the 38 voluntary boarders admitted during the year. There is a diminution in the number of rate-aided patients, and 70 per cent. of admissions belonged to the "private" class. An operating theatre, dental surgery, X ray room, and pathological laboratory have been equipped and brought into use. Ultra-violet ray therapy is a regular method of treatment, and a section has been equipped for the malarial treatment of cases of general paralysis. More wireless sets have been installed, and the entertainments for the patients are many and varied. The farm has produced all the mutton, pork, milk, eggs, poultry, and vegetables needed by the institution. Research on the variability of certain constituents of the blood in mental disease is being carried on in the laboratory. The visiting commissioner was well satisfied with what he saw, and remarks: "So much has been done to bring this hospital into line with modern ideas that I cannot but congratulate Dr. Robinson and the committee on all that has been completed." There are open door and club wards, and parole is allowed beyond the estate to 73 patients and within the grounds to 152 more. A sister tutor has been appointed, and four nurses obtained their M.P.A. certificate during the year, while three more passed the preliminary examination.

The *Glasgow Royal Asylum*, which publishes its 113th annual report for the year 1926, is another institution where the proportion of voluntary inmates is steadily increasing. Of the 148 patients admitted during the year, 78 were uncertified. The average number resident was 533, which constitutes a record; the death-rate was 8·8 per cent. and the recovery-rate 34·6 per cent. There was a small outbreak of scarlet fever and one case of typhus. Rapid progress is being made with the construction of an operating theatre and dental room, and a central kitchen and a refuse destructor are being built. Two general paralytics have been treated by malaria, and one has begun to show improvement. Over 400 attendances were recorded at the psychiatric out-patient clinic of the Western Infirmary. The occupational therapy department has organised a scheme of consideration of each patient as an individual, so that work can be adapted to each. Women who are very ill do simple raffia, woolwork, needlework, or card weaving. More convalescent cases do batik and vety colour work, and there is a small room for a noisy or disturbed patient who works best alone. In the central hall there are a series of tables for all kinds of crafts, and parole patients are free to come and go as they like. On the other side of the hall is a room for coöperative men patients, doing cane and basket work, brass repoussé work, and chip carving. The second room is a carpenter's shop, and for more difficult cases there is wool-winding, sand-papering, polishing, picture pasting and brushwork, among other occupations. The instructress presents an interesting special report on this work. 298 patients saw the dentist during the year; very few refused treatment.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED MAY 28TH, 1927.

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 266 (last week 313); scarlet fever, 1478; diphtheria, 845; enteric fever, 38; pneumonia, 941; puerperal fever, 32; puerperal pyrexia, 107; cerebro-spinal fever, 7; acute poliomyelitis, 9; encephalitis lethargica, 28; dysentery, 9; ophthalmia neonatorum, 114.

Cases of small-pox were notified from the counties of London 1 (Hackney), Derby 8, Durham 142, Lancaster 23, Northumberland 8, Nottingham 2, Stafford 1 (Bilston), Yorks North Riding, 7, West Riding 39, Glamorgan 1 (Gelligaer), Monmouth 34.

Deaths.—In the aggregate of great towns, including London, there were 2 deaths from small-pox, 1 (0) from enteric fever, 42 (2) from measles, 11 (5) from scarlet fever, 22 (4) from whooping-cough, 26 (9) from diphtheria, 47 (9) from diarrhœa and enteritis under 2 years, and 43 (7) from influenza. The figures in parentheses are those for London itself. Of the two deaths from small-pox one was registered from the metropolitan borough of Hackney; the other, from Hendon (Middlesex), referred to a death which occurred during the week ended May 14th.

Correspondence.

"Audi alteram partem."

THE TOTAL ECLIPSE OF JUNE 29TH.

To the Editor of THE LANCET.

SIR,—May I be allowed to point out the danger of *not* seeing the eclipse? The question of the dark adaption of the eye before the total phase seems very largely to have been ignored in the instructions given to the public; yet it is a matter that will make all the difference between seeing the corona well and seeing it badly—possibly, even, between seeing it and not seeing it.

In the days when visual observations of the corona were all-important the blindfolding of the observers five or ten minutes before totality was a recognised part of official programmes. On June 29th this precaution, or its equivalent, will be enormously more important than usual, for three reasons:—

1. Since the moon's shadow on this occasion is very narrow (about 15 miles broad) the brightness of the surrounding sky will be great and will largely "swamp" the coronal light.
2. Since the sun is at an extremely low altitude the light of the corona will be considerably diminished by atmospheric absorption.
3. Since totality only lasts about 20 seconds the eye will not have time to become dark-adapted. In fact, except for its bright lowest layers, the corona will be very difficult to see.

I do not suggest blindfolding. Few would do it, and those that did would not know when totality had started; some would remove the bandage too soon and undo all the good of blindfolding, others would remove it too late and miss part or all of those few seconds of totality. But I do suggest the desirability of putting on some dark, opaque mask—say, lined velvet—in which there are two eyeholes occupied by deeply tinted screens. The mask should tie tightly behind the head and so fit the face that no light can get in round the sides.

The screens must be the darkest that will still allow the sun just to be visible. Their density of tint will depend on the condition of the sky at the place and time in question. The simplest device is a number of strips of fogged photographic film of different densities. The darkest that still shows the sun should be used, and held firmly against the front of the mask. In that way one will be able to watch the partial phase and still achieve dark-adaption of the eye when the mask is slipped off at totality.

I know a lot has been written about the dangers to the eye of ultra-violet light and the inadequate protection of fogged films, but at the coming eclipse ultra-violet light will not enter into the question. At such a low altitude of the sun it will (unfortunately for astronomers) be almost entirely absorbed by the atmosphere.

But if the ultra-violet light during the partial phase can be ignored, the visible violet and blue light during totality should be taken account of. Since "scattering" of light in the air is inversely proportional to a high power of the wave-length, the visible light of the sky is mainly violet and blue. Hence we may hope to diminish the "swamping" of the corona by sky-light by watching totality through a simple yellow-tinted photographic light filter—one, I suggest, of which the "exposure factor" does not exceed 2.

I am, Sir, yours faithfully,
R. L. WATERFIELD.

The Royal Astronomical Society, Burlington House,
June 4th, 1927.

THE *Z* NOTION IN PSYCHOLOGY.

To the Editor of THE LANCET.

SIR,—The review in last week's issue of THE LANCET of Prof. McDougall's "Outline of Abnormal Psychology" prompts me to offer a hint to psychologists and to physicians. Apparently the view is spreading that a man is a conglomeration of cells, each of which has a personality that finds its self-expression in self-sacrifice to promote the continuance of the man. So far so good. Let the student of conduct take a step further and regard man as fundamentally and principally a chance unit in the conglomeration of creatures, animal and vegetable, that find their self-realisation in sacrificing themselves to ensure the continuance of the fundamental arch-creature that consists of all protoplasm that ever was, is, and will be; a creature that may be visualised as a thin, hollow sphere of some 8000 miles in diameter and may be symbolised in speech and writing by the letter Z. The theory, supported by nothing but by man's egoism, that the human race is a "whole" in the scheme of things has ever been a philosophical failure; it has made ethics, not only to the Greeks, foolishness, and psychology a castle in the air. The *Z* notion, carefully followed to its logical conclusions (each step checked by painstaking observation) can explain why man does as he does. It provides an entertaining field for philosophical speculation on an unhackneyed path, and—what to me matters most—it is the key to a treatment of the folks who have epilepsy that does more good than harm.

I am, Sir, yours faithfully,
ALAN MCDOUGALL.

The David Lewis Colony, Warford, Cheshire,
June 5th, 1927.

EXACERBATION OF CHOLECYSTITIS AFTER INJECTION OF SODIUM-TETRIODO-PHENOLPHTHALEIN.

To the Editor of THE LANCET.

SIR,—The following case seems to me to be of interest in showing a local disturbance due to injection of this dye in a case of cholecystitis. The patient, aged 59, housewife, was admitted to Charing Cross Hospital under Mr. N. C. Lake on March 30th last with symptoms pointing to a recent attack of cholecystitis. The injection of 30 c.cm. of the dye for cholecystography was immediately followed by a rise in temperature and lighting up of cholecystitis. Cholecystectomy was performed on the following day and all these symptoms rapidly disappeared. I do not think this complication in cholecystography has been reported before.

I am, Sir, yours faithfully,
E. A. CROOK,
Surgical Registrar, Charing Cross Hospital.

June 3rd, 1927.

Parliamentary Intelligence.

NOTES ON CURRENT TOPICS.

WHITSUNTIDE RECESS.

THE House of Commons adjourned for the Whitsuntide recess on Thursday, June 2nd. The House will meet again on Monday, June 13th.

EARLY SHOP CLOSING AND THE HEALTH OF YOUNG GIRLS.

Dr. MARION PHILLIPS and Mrs. ADAMSON gave evidence on May 31st on behalf of the Standing Joint Committee of Industrial Women's Organisations before the Departmental Committee appointed by the Home Secretary to inquire into the working of the Shops (Early Closing) Acts. They stated that in their opinion the best system of regulating shop hours would be by a general closing order which would require all shops to close at 7 P.M. on four days, 12 on one day, and 8 on one day. From their information the day on which the later closing day was most convenient is Friday; this was especially the case in textile areas where there were a large number of women who were both wage-earners and housewives. They had noted, however, that in a large number of districts the co-operative stores already closed at earlier hours than those without causing any difficulties, and the witnesses thought that there should be a power given to a local authority to make orders for closing at 6 o'clock. Such orders should not be made

until full inquiry had taken place, and in making the inquiry the opinion of the shop assistants should be taken. The inquiries the witnesses had made in regard to confectioners' shops showed that there was no real demand for the present later hours which prevailed. It had been pointed out to them that very often the girls employed were extremely young and suffered physically from the long hours. These shop assistants changed very frequently, probably because the work was found too heavy. Instances had been given of sickness and general debility among the girls in these shops. One case had been given where the girls usually stayed in bed on Sunday because of their exhaustion after the long Saturday hours. The witnesses held that a 48-hour week should be established for the workers, in addition to regulating the closing hours.

The Committee adjourned until June 15th.

HOUSE OF COMMONS.

WEDNESDAY, JUNE 1ST.

Artificial Light Treatment for Children.

Sir ROBERT THOMAS asked the Minister of Health what medical facilities existed in North Wales for the free treatment of children by ultra-violet light, in view of the value of this method of treating rickets, surgical tuberculosis, and other complaints to which children are liable.—Major BARNSTON replied: My right hon. friend is informed that the Flintshire and Denbighshire County Councils and the Wrexham Town Council have made arrangements for the provision of artificial light treatment for children at the Orthopædic Hospital at Gobowen, and that other county councils in North Wales occasionally send children to this hospital for treatment. Provision has been made by the Welsh National Memorial Association at the Wrexham Dispensary for artificial light treatment for children suffering from surgical tuberculosis, and it is also proposed to instal the necessary apparatus for this treatment at the North Wales Sanatorium, Denbigh.

Local Authorities and Provision of Playing Fields.

Mr. CAMPBELL asked the Minister of Health whether, in view of the importance of securing for the nation playing fields throughout Great Britain, he could take any steps to encourage local authorities to use their powers to acquire, lay out, and maintain land for the purposes of games and recreation.—Major BARNSTON replied: My right hon. friend can only repeat what has already been said in reply to similar questions. He is willing to consider sympathetically applications for sanction to loans for playing fields from local authorities, and a good deal has, in fact, been expended in recent years in the acquisition and laying out of land, though heavy rates and the present need for economy have prevented local authorities in some instances from making full use of their powers. My right hon. friend has also made a practice of urging local authorities to reserve land for open spaces and playing fields in their town-planning schemes.

Pensioner's Refusal to Undergo Operation.

Mr. HARMSWORTH asked the Minister of Pensions whether, having regard to the recommendation for operation at Queen Mary's Hospital, Roehampton, recently made in the case of a pensioner, he was still satisfied with the decision of the Ministry in November last year that the degree of disablement arising from the man's pensionable disability had been reduced from 30 per cent. to 20 per cent.; and whether the present degree of disablement was still at the latter figure.—Major TYRON replied: I find that this man has refused to undergo the operation recommended and has, therefore, been discharged from hospital as no other treatment is likely to be of benefit to him. In these circumstances I am not in a position to reconsider the assessment of the case.

Standardisation of Vaccines and Serums.

Mr. GROVES asked the Minister of Health whether he had issued any regulations dealing with the standardisation of vaccines and serums; and, if so, whether such regulations had been published for sale.—Mr. CHAMBERLAIN replied: Draft regulations under the Therapeutic Substances Act, 1925, were published and placed on sale last April. Substantive regulations have now been made after consideration of representations from the trade and other interests concerned and will come into operation on August 6th next, except those relating to labelling, which will not come into operation till Feb. 6th, 1928. These regulations will be laid before Parliament and will be available immediately after the Whitsun recess.

THURSDAY, JUNE 2ND.

Purity of Condensed Milk.

Major AINSWORTH asked the Minister of Health whether any standard test of purity and quality was applied to the importations of condensed milk into this country, especially from Switzerland; and, if so, what it was and how it was carried out.—Mr. CHAMBERLAIN replied: Samples of condensed milk are examined by the Government chemist and by public analysts to verify that it complies with the standard of composition laid down in the Public Health (Condensed Milk) Regulations, and is otherwise free from adulteration. The tests applied are matters for the discretion of the officers concerned, no standard tests being prescribed. I am not aware that any special attention is given to imports from Switzerland.

The Powers of the General Medical Council.

Mr. MACQUISTEN asked the Minister of Health whether, in view of the modern developments in the science and art of healing, he would cause to be appointed a Royal Commission to inquire into the operation of the Medical Acts of 1858, with a view to the alteration of the law, especially with reference to the powers and privileges of the General Medical Council.—Mr. CHAMBERLAIN replied: No, Sir. I do not think that modern developments in therapeutics necessitate any revision of the powers and duties of the General Medical Council, and my right hon. friend the Lord President of the Council shares my view.

Persons Insured under National Health Insurance.

Mr. HERBERT WILLIAMS asked the Minister of Health the number of males and females, respectively, who were insured under the National Health Insurance Act in England and Wales at the end of 1926, and the increase since the end of 1925.—Mr. CHAMBERLAIN replied: The approximate number of insured persons in England and Wales at the end of 1926 (inclusive of persons over 70 years of age who have ceased to pay contributions) was: males 9,857,000, females 4,658,000, the increases since the end of 1925 being 251,000 and 68,000 respectively.

Mr. HERBERT WILLIAMS asked the Secretary of State for Scotland the number of males and females, respectively, insured under the National Health Insurance Act in Scotland at the end of 1926, and the increases, as compared with 1925.—Sir. J. GILMOUR replied: At the end of 1926 there were 1,144,000 males and 571,000 females insured in Scotland under the National Health Insurance Act. These figures represent an increase of 28,000 and a decrease of 1000 respectively on the corresponding figures for 1925.

Health of the Troops at Shanghai.

Lieut.-Commander KENWORTHY asked the Secretary of State for War what steps were being taken in the interests of the health and comfort of the troops at Shanghai during the coming hot season; and whether he had considered sending the battalions in turn to Wei-hai-wei during the hot weather.—Sir L. WORTHINGTON-EVANS replied: Everything possible is being done for the comfort of the troops, and the necessary precautions have been taken to guard against outbreaks of those diseases which are liable to occur during the hot weather. A convalescent camp is being formed at Wei-hai-wei.

Cholera Epidemic in Bombay Presidency.

Mr. MORGAN JONES asked the Under Secretary of State for India whether he would give information as to the extent of the cholera epidemic in Bombay Presidency; and whether the epidemic was still spreading.—Earl WINTERTON replied: The latest official figures of attacks and deaths from cholera in the four affected districts in the Bombay Presidency relate to the week ended April 16th, and are as follows:—

	Attacks.	Deaths.
Belgaum District	1182* ..	575*
Dharwar ,, ...	872† ..	401†
Bijapur ,, ...	743‡ ..	256‡
Kanara ,, ...	21 ..	20

* Including 541 attacks and 249 deaths, † including 666 attacks and 316 deaths, ‡ including 194 attacks and 56 deaths which occurred previously but were reported during the week. According to press reports the totals in the four affected districts in the two following weeks were:—

	Attacks.	Deaths.
Week ended April 23rd	1401 ..	607
,, ,, ,, 30th	1092 ..	461

The latest official information received contains no figures, but indicates that the conditions continue to improve.

Women Police Doctors.

Mr. DAY asked the Home Secretary whether there had been any women police doctors appointed in the metropolitan police area.—Sir WILLIAM JOYNSON-HICKS replied: No women have been appointed to these posts.

Medical News.

UNIVERSITY OF CAMBRIDGE.—At a Congregation held on June 4th the following degrees were conferred:—

M.D.—C. H. C. Dalton, E. H. H. Granger, and L. E. H. Whitby.

M.B.—H. V. Dicks and H. V. Coverdale.

M.B., B.Chir.—R. K. Debenham, R. L. Lancaster, R. D. Milford, J. H. Randall, and R. E. Smith.

UNIVERSITY OF LONDON.—At recent examinations for the degrees of M.B., B.S. the following candidates were successful:—

With Honours.—Gilbert Cleary Babington (*a*), Max Barer (*a*, *b*, University Medal), Ernest Arthur Freeman (*d*), George Richard Nicol Henry (*a*), Winifred Annie Ladds (*b*, *c*), Florence Louis (*a*), James Meadowcroft Turner (*d*), Edwin Charles Warner (*b*), Hubert Lyon-Campbell Wood (*a*, *c*). (*a*) Distinguished in Medicine. (*b*) Distinguished in Pathology. (*d*) Distinguished in Surgery. (*c*) Distinguished in Midwifery.

Ordinary Degree.—Charles Everett Heyworth Anson, Cécile Helen Denise Asher, Arthur Leslie Banks, John Templeton Barr, Raymond Edward Barrett, Douglas Elliott Barton, Arthur David Beliltos, Joan Helen Blackledge, Douglas Arthur Blount, Eleanor Dorothea Blunt, Hilda Maud Price Bond, Derek Gordon Bown, Denis Anderton Brigg, Muriel Brighton, Margaret Hughes Brown, Helen Marion Browne, Helen Rosa Betty Buck, Thomas Saville Cochrane, Alexander Cohen, Mary Cecilia Emsley Constantine, Edgar Stuart Curtiss, Frederick James Darbyshire, Gwilym Ivor Davies, Tom Emrys Davies, John Dean, Arthur Edgar de Chazal, Jean Marguerite Dollar, Margaret Reiach Dunlop, Malcolm Herbert Cecil Dyson, John Evans, Frederick Mortimer Maurice Eyton-Jones, Dora Janet Fox, Alfred Edward Fraser-Smith, Joel Gabe, Bernard Marie Cole Gilsenan, Arkyl Staveley Gough, William Pickup Greenwood, Charles Herbert Hampshire, Kathleen Heyes, Henry Frederick Hiscocks, Janet Ireland Hoare, Joan Houseman, Eric Graham Howe, Ausa Hilton Jackson, Margaret Evelyn Ledger, William Leslie, Albert Henry Levers, Marian Lones, Joan Lydia Lush, Joyce McConnell, Alexander Cameron MacLeod, Gurdit Singh Malik, Charles Wallace Marshall, Isaac Muende, John Wright Nankivell, Helen Edith Maud Newman, Joan Nixon, Marjorie Ethel Parätt, Stephen Mary Power, Marion Ravell, John Herbert Owen Roberts, Llywelyn Roberts, Wemyss Cameron Robinson, Enid Helen Rockstro, Sidney Thomas Seccombe, Moses Sendak, Joseph Silverstone, Kenneth Shirley Smith, George Ernest Frederick Sutton, Frederick William Ta'Bois, Kathleen Edith Tresilian, Maeve Whelen, Elizabeth May Whishaw, John Stanley Whitton, Harry Keith Williams, Bernard Hugh Hahnemann Wooderson, Eric Wornum.

The following candidates were successful in the undermentioned parts of the examination:—

Group I.—Marjorie Flowers Brierley, Douglas Arthur Dewhirst, Phyllis Mary Edgar, Libero Fatti, Abraham Golombek, Charles Bertram Huss, Caroline Mary Kingsmill, Frank Edward Kingston, Richard Alban Vaughan Lewys-Lloyd, Isabella Louise Hamilton Livingstone, William Edward Lock, Helen Elizabeth Mayfield, Bertha Inez Meyer, Ethel Elizabeth Mary Ogilvie, Evelyn Doris Owen, George Edward Basham Payne, Margaret Eveline Peaker, Kudatelagé Richard Theobald Peiris, Edwin Seymour Phillips, Robert Lionel Quilliam, Eric Walter Skipper, John Robert Colquhoun Spicer, Victoria Winifred Symonds, Olive Mary Thomas, Frank Sheerman Thornton, Winifred Mary Turner, Joan Beatrice Walker, Richard Fowler Ward, Ronald Morgan Williams, Harry David Wyse.

Group II.—George Thomas Allerton, Chandumal Asanand Amesur, Vernon FitzClarence Anderson, Charles Glynne Bowen, Frank William Bradley, Philip John Lauriston Capon, John Adye Cholmeley, Doris Beatrice Clay, Roy Reiach Fells, Percy Hebden Flockton, James Rocheid Forrest, Krishnalal Tribhovandas Gajjar, Dorothy Godden, Colin Hugh Harper, Theodore Henry Hobbes, Kenneth Harry Lachlan, Malcolm Langley Maley, William Drew Nicol, Nathoobhai Dayalji Patel, Gangadhar Martand Phadke, Brian Fitzgerald Russell, Charles Francis Joy Smith, William Robert Colquhoun Spicer, Kathleen Mary Stuart-Harris, Olive Fredrica Sydenham, Edward Cowper Tamplin, Fauset Welsh, John George Weston, Charles Louis Worthington, Elsie Bodley Wright.

UNIVERSITY OF EDINBURGH.—On July 20th, during the British Medical Association's visit to Edinburgh, the degree of Doctor of Laws will be conferred on Lord Dawson of Penn, Prof. Archibald Donald (Manchester), Dr. C. E. Douglas (Cupar), Sir William Hale-White (London), Mr. R. G. Hogarth (President of the Association), Dr. William Hunter (London), Prof. T. H. Milroy (Belfast), Sir Berkeley Moynihan, P.R.C.S. Eng., Sir John Parsons (London), Sir Humphry Rolleston (Cambridge), Dr. G. F. Still (London), Mr. Wilfred Trotter (London), Sir Almroth Wright (London), Prof. Vittorio Ascoli (Rome), Prof. Jules Bordet (Brussels), Prof. Harvey Cushing (Harvard), Prof. C. L. Dana (Cornell), Prof. Knud Faber (Copenhagen), Prof. J. van der Hoeve (Leyden), Prof. Otto Meyerhof (Berlin), Prof. Otto Naegeli (Zürich), Prof. W. S. Thayer (Johns Hopkins), and Dr. Théodore Tuffier (Paris).

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH.—The Dr. Alexander Black lecture for 1927 will be delivered by Dr. C. E. Douglas in the hall of the College on Wednesday, June 15th, at 5 P.M. The subject will be the Family Doctor as Specialist.

BIOCHEMICAL SOCIETY.—The next meeting of this society will be held in the Biochemical Department, The Museum, Oxford, to-day, Saturday, June 11th, at 3 P.M.

INSTITUTION OF HEATING AND VENTILATING ENGINEERS.—The summer meetings of this Institution will be held at Bournemouth from June 20th to 22nd. Particulars may be had from the secretary, 12, Russell-sq., London, W.C.1.

AUSTRALIAN AND NEW ZEALAND MEDICAL ASSOCIATION IN ENGLAND.—The summer dinner of this Association will be held on June 17th at the Piccadilly Hotel. Sir John Bland-Sutton will be the official guest. Mr. Joseph Cunning will be in the chair. Medical visitors are invited.

NATIONAL CONFERENCE ON MATERNITY AND CHILD WELFARE.—This conference is to be held in the House of the British Medical Association, Tavistock-square, London, W.C. 1, from July 5th to 8th, under the presidency of Mr. Neville Chamberlain, Minister of Health. The programme may be obtained from the hon. secretary, at 117, Piccadilly, London, W. 1.

JOINT TUBERCULOSIS COUNCIL.—Sir Henry Gauvain has arranged to hold a post-graduate course on Non-pulmonary Tuberculosis at Lord Mayor Treloar Cripples' Hospital and College, Alton, Hants, from Monday, June 27th, to Saturday, July 2nd. The class is limited to ten members and there will be no fee. Particulars may be had from the hon. secretary, Post-Graduate Courses, The Larches, Farnham Royal, Bucks.

INDIAN MEDICAL SERVICE DINNER.—The annual dinner of the Indian Medical Service will be held at the Trocadero Restaurant on Wednesday, June 15th, at 7.15 for 7.30 P.M. Major-General R. W. S. Lyons will take the chair. Tickets and all particulars may be obtained from the joint hon. sec., Col. J. J. Pratt, I.M.S. (ret.), 18, Nevern Mansions, Warwick-road, London, S.W.5.

NURSING AWARDS.—The decoration of the Royal Red Cross, Second Class, has been conferred upon Miss Emily de la Hoyde, matron, and Miss Catherine Annie Waugh, nursing sister, both of the Indian Temporary Nursing Service, in recognition of the special devotion and competency displayed by them in their nursing duties with the British Forces in Iraq.

THE LATE Dr. E. L. CAMBIE.—The death is announced of Dr. Edward Loftus Cambie, on May 28th, at his residence at Templemore, Co. Tipperary. Educated at the Royal College of Surgeons and at the University of Dublin, Dr. Cambie took the qualifying diploma of the Irish Colleges in 1892. At first he practised in London, but afterwards settled at Portsmouth, where he worked for 21 years. Not long ago he returned to Ireland. Dr. Cambie leaves a widow and one son.

PRIZES AT LONDON MEDICAL SCHOOLS.—On Tuesday, June 21st, in the Governors' Hall, the Duke of Connaught will distribute the prizes won at St. Thomas's Hospital Medical School. On his arrival at 3 P.M. he will unveil a tablet on which are inscribed the names of those of St. Thomas's Hospital who fell in the late war.

The President of the Board of Education, Lord Eustace Percy, on Wednesday, June 29th, at 3 P.M., will distribute the prizes at the London Hospital Medical College and Dental School in the College Library.

COMPULSORY REMOVAL.—Proceedings were taken at Birmingham last week against a young woman who had been certified at the Birmingham Dispensary as suffering from tuberculosis in an infectious stage and who had failed either to take proper precautions against spreading the disease or to accept hospital treatment. She shared a bed with a female lodger and had refused to make other arrangements in spite of an offer by the Health Department to lend her a single bed. Adjourning the case, the stipendiary magistrate said if she did not comply with the requirement to occupy another bed he would order her removal to a sanatorium.

THE LATE Dr. H. T. WRIGHT.—After some 12 years of practice at Foleshill, Dr. Herbert Trouncer Wright has died at Northampton at the age of 58. He was a Scotsman and qualified with the Scottish triple diploma in 1897. For some years he acted as medical officer of health and public vaccinator for the No. 2 district of Alston in Cumberland; then he went to Derby and finally he settled in Foleshill, first as assistant to Dr. John Orton, and afterwards in practice by himself. Dr. Wright was twice married and leaves two children.

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

THURSDAY, June 16th.—5 P.M., DERMATOLOGY. (Cases at 4 P.M.). Dr. Parkes Weber: Early Angioma Serpiginosum with Another Early Case (previously shown) for Comparison. Dr. G. B. Dowling: (1) Rare Seborrhoide of the Face (Pringle); (2) Acne Agminata. Other cases will be shown.

FRIDAY.—8 P.M., OBSTETRICS AND GYNÆCOLOGY. Specimen: Mr. W. Gilliatt: X Ray Demonstration of a Case of Nägele's Pelvis. Short communications: Mr. J. B. Banister: Some Results of Myomectomy Undertaken in the Hope of Curing Sterility. Mr. A. C. Palmer: Some Notes on Five Cases of Tuberculosis of the Female Genital Tract, with special Reference to the Endometrium. Paper: Dr. R. A. Gibbons: The Cause of the Onset of Labour.

MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square, W.

MONDAY, June 13th.—8 P.M., Annual General Meeting. 9 P.M., Annual Oration by Prof. Harvey Cushing on the Surgical Aspects of Acromegaly, followed by a Conversazione.

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE, 11, Chandos-street, Cavendish-square, W.

THURSDAY, June 16th.—8.15 P.M. (preceded by a demonstration at 7.45), Annual General Meeting followed by the Induction of New President, Prof. J. W.W. Stephens, of Liverpool. Presentation of Chalmers Medal awarded to H. Lyndhurst Duke, of Uganda. A paper will be read by Dr. L. Fabian Hirst, of Ceylon, on Rat Flea Surveys and their Use as a Guide to Plague Preventive Measures.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.

TUESDAY, June 14th.—5 P.M., Sir F. Gowland Hopkins: The Task of Biochemistry. (Second Croonian Lecture.)

THURSDAY.—5 P.M. (Third Croonian Lecture.)

LONDON SCHOOL OF DERMATOLOGY, St. John's Hospital, 49, Leicester-square, W.C.

TUESDAY, June 14th.—5 P.M., Dr. H. W. Barber: Alopecia Areata and Vitiligo.

THURSDAY.—5 P.M., Dr. K. N. G. Bailey: Pathology Demonstration.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.

MONDAY, June 13th.—2.30 P.M. to 5 P.M., Medical, Surgical, and Gynæcological Clinics. Operations.

TUESDAY.—2.30 P.M. to 5 P.M., Medical, Surgical, Throat, Nose, and Ear Clinics. Operations.

WEDNESDAY.—2.30 P.M. to 5 P.M., Medical, Skin, and Eye Clinics. Operations.

THURSDAY.—11.30 A.M., Dental Clinic. 2.30 P.M. to 5 P.M., Medical, Surgical, and Ear, Nose and Throat Clinics. Operations.

FRIDAY.—10.30 A.M., Throat, Nose, and Ear Clinics. 2.30 P.M. to 5 P.M., Surgical, Medical, and Children's Diseases Clinics. Operations. 4.30 P.M., Special Demonstration on selected cases of Nerve Diseases.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.

THURSDAY, June 16th.—4 P.M., Mr. Eric Lloyd: Acute Mastoiditis.

ROYAL NORTHERN HOSPITAL, Holloway-road, N.

MONDAY, June 13th.—2.30 P.M., Mr. F. D. Saner: Clinical Round on Surgical Cases.

TUESDAY.—3.15 P.M., Mr. T. Twistington Higgins: Mammary Tumours.

UNIVERSITY OF SHEFFIELD POST-GRADUATE CLINICS.

TUESDAY, June 14th.—3.30 P.M. (at the Jessop Hospital), Mr. Chisholm: Some Gynæcological Cases.

FRIDAY.—3.30 P.M. (at the Royal Infirmary), Prof. Connell: Clinical Cases.

Appointments.

DEACON, J. N., M.B., B.S. Lond., has been appointed Resident Medical Superintendent of the Hendon Union.

LLOYD-WILLIAMS, I. H., M.B., B.S. Lond., Certifying Surgeon under the Factory and Workshop Acts for the Burgess Hill District, Sussex.

RANKIN, ROBERTA THERESA, M.B., Ch.B. Edin., Assistant Medical Officer of Health to the Lancaster Corporation.

SHANKS, HELENA, M.B., Ch.B. Glasg., Resident Medical Officer at Falkirk Burgh Infectious Diseases Hospital.

Manchester Royal Infirmary: WRIGLEY, F. G., M.D. Manch., Honorary Assistant Aural Surgeon; SEWELL, D. L., M.B., B.S. Lond., Aurist and Laryngologist.

Vacancies.

For further information refer to the advertisement columns.

Bath, Royal United Hospital.—H.S. £120.

Bethnal Green Hospital, London, E.—Asst. M.O. £100.

Birkenhead County Borough.—Asst. M.O. £450.

Brighton, Royal Alexandra Hospital for Sick Children.—Sec. and Jun. H.S.'s. £120 and £100 respectively.

Brighton, Royal Sussex County Hospital.—H.S. and H.P. Each £150.

Bristol General Hospital.—Hon. Asst. S. to Ear, Nose and Throat Dept.

Cambridge, Addenbrooke's Hospital.—Cas. O. At rate of £130.

Cancer Hospital, Fulham-road, S.W.—H.S. At rate of £100.

Cardiff, Welsh National School of Medicine.—Asst. in Medical Unit.

Charing Cross Hospital, Strand, W.C.—Registrar. £100. Also Hon. Anæsthetist.

Durham County Hospital.—Jun. H.S. At rate of £120.

East London Hospital for Children, &c., Shadwell, E.—Res. M.O. £200.

Elizabeth Garrett Anderson Hospital, Euston-road, N.W.—Obstetrician.

Gloucester County Mental Hospital.—Jun. Asst. M.O. £350.

Hellingly, Sussex, East Sussex County Mental Hospital.—Jun. Asst. M.O. £350.

Hospital for Consumption and Diseases of Chest, Brompton, S.E.—Med. Reg. £300.

Ipswich, East Suffolk and Ipswich Hospital.—H.S. and Cas. O. £100.

Manchester, Ancoats Hospital.—Res. M.O. At rate of £150.

Manchester, Crossley Maternity Hospital, Ancoats.—Res. M.O. At rate of £50.

Manchester, Hulme Dispensary.—Res. M.O. £300.

Manchester Royal Infirmary.—Asst. M.O. £35.

Middlesex Hospital Medical School, Bland-Sutton Institute of Pathology.—Asst. for Cancer Research. £350.

Miller General Hospital, Greenwich-road, S.E.—Cas. O. and H.S. £150 and £125 respectively.

Nottingham Children's Hospital.—Res. H.S. At rate of £150.

Oldham Royal Infirmary.—Three H.S.'s. Each at rate of £175.

Penshurst, Kent, Cassel Hospital for Functional Nervous Disorders—Res. M.O. £350.

Poplar Metropolitan Borough.—Consulting Phys. 1½ guineas per attendance.

Royal Army Medical Corps.—Commissions.

Royal Chest Hospital, City-road, E.C.—P. to Out-patients.

Royal Naval Dental Service.—Dental Officers.

Royal Northern Hospital, Holloway, N.—H.S. At rate of £70.

Royal Waterloo Hospital for Children and Women, Waterloo-road, S.E.—H.P. At rate of £100. Also Asst. Radiologist. £50.

St. Helens County Borough.—Deputy M.O.H. £700.

St. John's Hosp., Lewisham, S.E.—Res. Cas. O. At rate of £100.

St. Mary's Hospital, W.—Asst. Pathological Chemist. £300.

St. Peter's Hospital for Stone, &c., Henrietta-street, Covent Garden, W.C.—Clin. Assts.

Seamen's Hospital Society, Dreadnought Hospital, Greenwich.—Anæsthetist. 50 gs. Also H.P. and H.S. At rate of £110.

Southampton, County Borough.—Asst. M.O.H. £600.

Southampton, Royal South Hants and Southampton Hospital.—Jun. H.S. At rate of £150.

South London Hospital for Women, Clapham Common, S.W.—Asst. P.

Sudan Government Medical Dept.—M.O. £E.720.

Sudan Government, Wellcome Tropical Research Laboratories, Khartoum.—Asst. Bacteriologist. £E.720.

Swansea General and Eye Hospital.—Sec. Supt. £500.

Tunbridge Wells and Counties General Hospital—H.S. £160.

University College Hospital, Gower-street, W.C.—Surg. Reg. £250.

University of London.—University Chair of Pathology. £1000. External Examinerships.

West-End Hospital for Nervous Diseases, Gloucester Gate, Regent's Park, N.W.—Sen. H.P. Also Jun. H.P. At rate of £150 and £100 respectively.

West London Hospital, Hammersmith-road, W.—H.P. and H.S. Each at rate of £100.

Wrexham and East Denbighshire War Memorial Hospital.—Two H.S.'s. Each at rate of £100.

Births, Marriages, and Deaths.

BIRTHS.

NIXON.—On May 27th, at Lansdown-place, Clifton, Bristol, the wife of Dr. J. A. Nixon, of a daughter.

WOODHOUSE.—On May 29th, at Firstone, The Highway, Sutton, Surrey, the wife of Sydney C. Woodhouse, M.B., M.R.C.S., of a son.

DEATHS.

COOK.—On May 30th, at Chesneye, Lee-on-Solent, Surgeon-General Henry Cook, M.D., I.M.S. (retd.), F.R.C.P., F.R.G.S., F.R.M.S., F.G.S., J.P., in his 96th year.

FULLER.—On May 27th, at Milnthorpe, Westmorland, of heart failure, William Anderson Fuller, M.R.C.S., L.R.C.P.

MCMILLAN.—On May 31st, suddenly, at Lyncroft, Sandown, I.W., John Furse McMillan, Captain R.A.M.C. (retd.), M.R.C.S., L.R.C.P., L.S.A., aged 67.

SMALLPEICE.—On June 2nd, at a nursing home, Donald Smallpeice, L.R.C.P., M.R.C.S., of St. Martha's Lodge, Guildford, aged 74.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Comments, and Abstracts.

ON ESTIMATING THE VALUE OF REMEDIES IN PULMONARY TUBERCULOSIS.

BY F. R. WALTERS, M.D., M.R.C.P. LOND.,
PRESIDENT OF THE SOCIETY OF SUPERINTENDENTS OF TUBERCULOSIS INSTITUTIONS.

THE following remarks are intended to help those who are trying to assess the value of remedies in pulmonary tuberculosis, including so-called "consumption cures." Laymen commonly regard this as a simple matter; but those better acquainted with the disease know well the difficulties and complexity of the problem. In testing a remedy we must have fairly definite groups of cases, and use the proposed remedy in a definite and fairly uniform way. To arrive at reliable conclusions we need a similar group of cases as a standard of comparison. So long as we are dealing with symptomatic remedies this is comparatively easy to arrange; but in seeking a more comprehensive remedy it is far otherwise. Hence the long list of such drugs and preparations, beginning with creosote and hypophosphites, ending with the Spahlinger remedies and sanocrysin. Some of these have been discredited after a period of great popularity; concerning others medical opinion is much divided; while yet others are still on trial.

Analysis of Cases.

Our cases should be analysed in a way corresponding with all the more important factors in prognosis; what we have to do is to find out how far the remedy will affect the prognosis.

Stage, grade, and complications.—One of the earliest methods of appraising the value of treatment in this disease which has stood the test of time was based on the nature and extent of the local lesions (stage), to which was added by others the degree of constitutional disturbance (grade), and the presence or absence of serious complications. All the more useful classifications are based upon these principles. A classification which is comparable with the chief ones employed in America and the continent, and which comprises and defines these factors, was devised by the Society of Superintendents of Tuberculosis Institutions [1] and adopted by some other kindred societies. This classification (or one like it) is essential for our purpose.

Type of local disease.—Another important point is to decide whether the lesions present are mainly fibroid, mainly exudative (caseation, &c.), or mixed. The decision is not always easy, but is worth attempting. Where there is doubt the case should be classed as mixed in type. The distribution of the lesions is also important. Well-localised foci are more favourable than scattered tubercle.

Activity of the disease.—Active disease may be inferred where there are progressive lesions in the chest, or constitutional disturbance, especially febrility or raised pulse-rate. Slight febrility is important in this connexion and cannot be detected by the usual methods of thermometry.[2] Menstrual fluctuations of temperature in women add considerably to the difficulty of the problem. Temperatures are affected by rest and exercise, so that Inman's classification into (1) resting febrile; (2) resting afebrile, ambulant febrile, (3) ambulant afebrile, is useful in gauging progress. Tubercle bacilli in the sputum are not an infallible sign of activity. They may be present for years without constitutional disturbance or evidence of spread in the lesions.

Rate of progress of the disease.—Since cases differ greatly in the time occupied in arriving at a similar stage, it is useful to divide them into slow, medium, and rapid. This can be done if we can fix the date of appearance of the earliest symptoms attributable to tuberculosis of the lungs. Some symptoms—such as hæmoptysis—arise also from other quite unconnected causes. I think the best rule would be to regard the symptoms as due to tubercle if there is no other probable cause discoverable, and if there is unmistakable evidence of tuberculosis later on. Quite commonly we find evidence of a series of breakdowns of tuberculous nature separated by healthy intervals. There may also be a history of tuberculous signs or symptoms in some other part of the body. If so, this should be noted, with the date.

Mode of onset.—We should distinguish the mode of onset—whether insidious, or following immediately after pleurisy, pneumonia or a chest injury, or an acute illness of another kind. The illness which caused the breakdown in health may modify the course of the disease.

Mixed infection.—The presence of other pathogenic organisms in the sputum should also be noted, periodical analyses being made. Some remedies which are useful in pulmonary tuberculosis (such as creosote) probably act mainly (or entirely) on associated infections.

Natural resistance.—Pulmonary tubercle is the resultant of three groups of factors: the original infection, the natural resistance, and the conditions of life generally. Amongst the latter we can eliminate the cases due to *faulty hygiene* by noting the progress made during an observation month under better conditions. The chief point concerning the original infection is to decide whether *massive infection* was likely. This may be inferred where there has been close association with a patient suffering from advanced disease and known to have neglected the usual precautions as regards sputum. Where both of these causes (faulty hygiene and massive infection) seem to have been absent, and yet the disease has made rapid progress, we may infer feeble resistance. Most of our present population have a high resistance to tubercle, since most are infected, but only a minority fall ill with the disease; but after acute illnesses, childbirth, and serious accidents, resistance to tubercle is probably temporarily reduced.

The effect of *repeated infections* is still sub judice. In my opinion small doses may actually protect, while repeated large doses of infection at short intervals will almost certainly reduce the resistance. It is not, I think, safe to assume that resistance is low because of a *family history* of tuberculosis alone, as other factors are concerned besides inheritance. It is a mistake to regard the disease as mainly due to infection. Lack of resistance, temporary or permanent, together with the conditions of life, have much more to do with it. In proportion as a community becomes immunised against tubercle, so does the relative importance of causes other than infection increase.

Age and sex.—The resistance to tubercle is notably dependent upon age and sex. In early childhood resistance has not yet been established. Later on comes a more favourable period; but with the advent of puberty in girls, and possibly also in boys, the constitution is decidedly less resistant to the disease. In women menstruation and childbirth are times of danger, which may help to light up an attack.

Conditions of Life.

Three sets of factors have to be remembered under this heading: *climate and situation*, the *house and quarters*, *personal hygiene and habits*. Under the first heading would be included the usual climatic factors which affect health; and the position of the home or institution—whether rural or urban, high up or low lying, dry or damp, sheltered or windswept. Under the second heading would fall ventilation, cleanliness, dryness, and state of repair so far as affecting health. The third heading would comprise all relevant matters of personal hygiene, food-supply, personal habits, occupation, rest and exercise, and observance or otherwise of sanatorium rules, especially the regulation of the day's happenings according to an accurate temperature record. If is not safe to draw conclusions about a general remedy in tuberculosis without taking account of such factors. Irregular meals, or shut bedroom windows, or an injudicious excursion will often have more noticeable effect on the health of such a patient than most drugs, even such as are of undoubted value.

The Remedy.

Mode of employment.—Having ensured uniformity in the trial group and control, and in the conditions of life generally, we must be equally definite in the manner of using the remedy. The difference of opinion concerning the value of tuberculin is a good example of the confusion which arises through neglect of this precaution. Apart from the numerous varieties of tuberculin, there are many ways of administration, differing in dosage, intervals, criteria for choice of these, and conditions under which the remedy is given. The most important difference is between the methods of cumulative and non-cumulative dosage. In the former method doses are increased as rapidly as constitutional disturbance will permit, another dose being given before the effects of the previous one have worn off, with the result that the sensitiveness of the body to the remedy is eventually abolished. In the other method the doses are increased much more slowly, at longer intervals, and a second dose is not given until the effect of the first has subsided, the sensitiveness of the body towards the remedy being maintained or even increased. Both of these methods cannot be correct; yet they have not usually been distinguished in the published reports.

Adequate time of treatment.—Adequate periods of treatment are necessary, both in the controls and in the test cases. Under Alpine climatic treatment many cases are recommended to spend two winters and a summer in the Alps;

[1] See Tubercle, November, 1921, p. 90; F. R. Walters: Domiciliary Treatment of Pulmonary Tuberculosis, second edition, p. 277.

[2] See S. Vere Pearson: the Temperature as a Guide to the Treatment and Prognosis of Phthisis, THE LANCET, Sept. 8th, 1909; F. R. Walters: Loc. cit., p. 10, et seq.

and it would be illogical to condemn the treatment because such a patient did not recover in two months. Under ordinary hygienic treatment, lasting results cannot be expected in less than three months in early (first stage) afebrile cases; yet sanatorium treatment is often condemned because patients with well-marked fever or with second or third stage lesions do not get well in three months; such cases need far more prolonged treatment, or the equivalent at home, to secure lasting benefit. In every case, whatever the remedy adopted, it should be continued until there is a reasonable probability of the maximum benefit having been attained.

How the remedy acts.—To obtain evidence of permanent value we must know not only that the remedy is useful, but how it acts and under what circumstances. The same remedy is not necessarily the best for every stage of the disease, since the hindrances to recovery will not be the same throughout, and the damage done by prolonged illness complicates the matter in the later stages. In an early stage the defence is mainly by a modification of the inflammatory process—the formation of granulomata. Later on the natural production of antitoxins comes into prominence, and the removal of caseous and other damaged tissues. Consequently remedies which increase the amount of circulating toxin—even temporarily—must be used with the greatest caution in patients with extensive lesions or toxæmia.

Pulmonary tuberculosis has far-reaching effects on many parts of the body; in well-marked cases there is a steady drain on the immunising machinery, on the organs of nutrition, digestion, and circulation which support it, and on the excretory organs which deal with the products of metabolism in the affected tissues. Attack and defence are often very nearly balanced, so that a little extra help may turn the scale. For instance, a remedy which restored the appetite and so improved nutrition, or one which ensured refreshing sleep when there was harassing cough, might do immense good; and this is the justification of symptomatic treatment. Yet such remedies could not be regarded as "cures" for consumption.

No reliable *bactericidal* drug has so far been discovered. Many antiseptics kill the bacillus in cultures, but do not reach it in lethal doses in the body without damaging the latter. Salts of gold and copper appear to be the most promising. Some remedies are known which hinder the growth of the bacillus. According to Gräfin von Linden, methylene-blue has such an action in experimented animals. Destruction of the bacillus in all but the earliest stages involves katabolism of caseous and other damaged tissues and liberation of toxins.

Many remedies are known which *stimulate the immunising organs*, and so act indirectly on tuberculous tissues. These remedies fall naturally into two groups, specific and non-specific, of which the former act in very minute doses. Prominent examples of the former group are tuberculin and its allies; of the latter group, sanocrysin and other gold salts, copper salts, and cantharidin. Probably every member of these two groups causes hyperæmia of the affected tissues. Possibly large doses are destructive, while smaller ones promote fibrosis. Creosote, guaiacol, and camphor are also stated to promote fibrosis of the tuberculous foci. Remedies given to promote leucocytosis and chemotaxis have proved to be disappointing. Various balsams were tried for this purpose. Cinnamic acid (introduced by Landerer) damages the blood after three days. Camphor is stated to have a chemotactic action.

Active immunisation with *living bacilli*, in imitation of vaccination against small-pox, has been attempted by Friedmann, Möller, Calmette, and others, but is probably not free from danger.

Passive immunisation (as in diphtheria) has been aimed at by a number of investigators, but does not appear to have been satisfactory. There is probably some antagonism between active and passive immunisation, as the presence of some circulating toxin appears to be necessary to cause a formation of antitoxins.

Biochemical immunisation is quite conceivable, but has not yet been effected, as we know too little about the biochemical difference between those who suffer from infection and those who do not. Hygienic remedies, such as an open-air life, occupations promoting the flushing of every part of the lung with pure air, and plenty of suitable food, are still the most efficacious remedies known for protecting the body against tuberculosis. Whether vitamins play a part in the defence has not yet been determined. We are still doubtful as to the precise mode of action of even so well-established a remedy as cod-liver oil. The French method of remineralisation appears to rest upon an insecure foundation. Lime salts do not promote healing in tuberculous foci; they merely infiltrate them as they do all unirritating worn-out tissues.

Surgical methods such as artificial pneumothorax ensure local rest and reduce the absorption of toxins. They are, therefore, invaluable in certain cases, but are unfortunately only applicable to a small percentage, and even then can only deal with some of the lesions.

Suiting the Remedy to the Case.

No universal remedy has so far been proved to be reliable. The specific and other general remedies which are useful in afebrile cases do not appear to be suitable for the toxæmic, for which hygienic remedies—rest, fresh air, &c.—are still the most widely applicable. An antitoxin that would cause passive immunisation without interfering with the processes of active immunisation would be a great boon in toxæmic cases. Patients who suffer from pulmonary tuberculosis do not all lose ground for the same reasons. In one it may be the digestion, in another the circulation that fails; so that in all but early stage cases more than one remedy would appear to be necessary.

The Results of Treatment.

To prove the value of a remedy in pulmonary tuberculosis it is not enough to show that improvement—or even recovery—has resulted under its use, for this is true of every one of the numerous remedies ever recommended, some of which are now discredited. Since many factors influence the result besides the special remedy, and there is a natural tendency to recovery in most of our present population, this is quite intelligible, though often lost sight of.

Present methods of treatment are capable of restoring to health in most of the early cases, and many of the more advanced; but they have the drawbacks that the treatment is insufficient in some cases, is necessarily prolonged, is sometimes highly inconvenient, and will usually only lead to a recovery which is dependent upon the after-conditions of life. If, then, a new remedy can be shown to make the necessary treatment shorter, more widely reliable, more convenient, or more lasting and unconditional, it is well worth adopting. This claim has been made on behalf of several remedies not universally accepted—notably for tuberculin—but owing to the imperfections of the tests applied has not been substantiated.

Immediate or remote results.—Unless the after-conditions are known and taken into account, the remote results are not a safe measure of the efficacy of treatment. Survival is a measure, not merely of the value of treatment, but also (and much more) of the suitability of the after-conditions and of the permanent damage done to lungs and other organs. Even after complete arrest of the tuberculosis, the life is below standard, and liable to be cut short by circumstances not directly connected with the original illness or its treatment.

Estimation of Progress.

There are two possible ways of recording progress: either to record the progress made in a given time, or to record the time necessary to arrive at a given degree of improvement. Each method has its convenience according to circumstances; but the latter is more precise when treatment is not arbitrarily limited, but is continued until the maximum benefit has been obtained.

Progress in a given time.—In this method the improvement effected in various respects will have to be summarised by some suitable classification. One of the simplest is into (1) well, (2) better, (3) stationary, (4) worse, (5) dead. It is, however, arbitrary, and does not distinguish (as it should) between local and general improvement. A more complete classification, in which the terms are defined, was devised by the American National Association for the Prevention of Tuberculosis, with modifications by Lawrason Brown.[3] This classifies the results into (1) apparently cured, (2) arrested, (3) improved, (4) unimproved or progressive, (5) dead. This is quite convenient where the time of treatment is prolonged; but in many sanatoriums in this country the time of treatment is limited for most cases to two or three months, so that the results could only be classed under the last three headings.

Measurement of time required is often possible when the foregoing method would be fallacious or inapplicable. We may choose some definite sign of improvement, such as the disappearance of râles (if there is no mixed infection), of fever (resting or ambulant), of sputum, or tubercle bacilli in the latter. More useful research could be done in this way, by noting the average time required with and without the special remedy in similar groups of patients than in searching for "remedies for consumption" when the time and conditions were inadequate for a fuller test.

Space does not permit me to discuss the various signs and symptoms of improvement. Some of these—such as gain in weight—are only applicable for limited periods. Others—such as disappearance of sputum or of râles—are equivocal, and must be taken together with other circumstances in deciding whether they are signs of improvement or not. When progress is slow, and the evidence obscure, other criteria should always be adopted as well as the usual clinical

[3] Jour. Amer. Med. Assoc., Jan. 30th, 1909.

ones—notably the blood tests and the graduated Pirquet.[4] Among the more useful blood tests may be mentioned the Arneth test, differential leucocyte counts (leucocytosis with increase of lymphocytes and of eosinophils is favourable), the sedimentation test, and some of the chemical tests. One caution is necessary respecting physical signs. These should be similarly estimated before and after treatment and in the controls; X ray findings are not comparable with those by ordinary clinical methods. If both are not available, the latter is preferable in expert hands. Care should also be taken to distinguish between consolidated and fibrosed areas. I have known elaborate treatment employed in a case where there was no evidence of any active tuberculosis, only the results of past disease.

Conclusions.

Recovery in pulmonary tuberculosis depends on so many variable factors that extreme care is necessary in estimating the value of a remedy in this disease, especially one which acts upon several parts of the body, or is reputed to have a general curative effect. We must take into account the clinical state of the patient, points in the history enabling us to estimate his resisting power and the fierceness of the attack, the general conditions of life, including dominant hygienic factors, observance of ordinary "sanatorium" rules, and factors of climate, site, and quarters. The remedy must be applied to a fairly definite group of patients in a definite and fairly uniform manner, and should be continued until there is reasonable probability of having attained the maximum benefit. Controls should be chosen, of a similar nature, under similar conditions, excepting always the factor to be tested.

Remote results are not reliable, because they depend not only on the original course of treatment, but also largely on the conditions of life and the amount of permanent damage to lungs and other organs before, during, and after treatment. To estimate the immediate results we need a careful classification in which the terms are defined. Where prolonged treatment is not available, valuable information may be obtained by estimating the average length of time necessary to attain some definite result, such as disappearance of fever or of râles. Just as in pharmacological investigations the action of the remedy on each physiological system is noted, so should it be with the remedies of tuberculosis. More useful conclusions are likely to be arrived at by studying the effect of any reputed "cure" on the individual factors of the disease than by merely recording "improvement" or "recovery," a conclusion which teems with fallacies.

VENEREAL DISEASE IN BRITISH COLONIES.

THE British Social Hygiene Council brought a number of recommendations before the recent Colonial Office conference. To stamp out venereal disease, they said, the primary need is for medical men and women, specially qualified, to be placed in charge of antivenereal work with adequate facilities. In appointing medical officers in the future the Colonial Office should demand of candidates an efficient knowledge of the diagnosis and treatment of venereal diseases, and study leave should be given to medical officers already employed to enable them to secure the necessary knowledge. Where the appointment of a specialist was impracticable for some single small unit of the Empire, it might prove effective to appoint a specialist who could hold post-graduate courses in a number of centres, who could devise and supervise special treatment facilities in each centre, who could act as adviser to the chief medical officers on the spot, and could promote a campaign for public enlightenment. Outlying parts of the Empire, it was pointed out, are paying 50 per cent. more for neosalvarsan preparations than the institutions giving free treatment under the Ministry of Health in this country; combined action should be taken by the Colonies in the purchase of drugs. The question of education was discussed, and it was proposed that as emergency measures, pending the adequate training of teachers, arrangements should be made between the Colonial Office and groups of colonies for visits to be paid by a biologist and a psychologist to the different units and for scholarships to be offered to enable selected teachers to take a full year diploma course which, it is hoped, will shortly be available at the Universities of London, Wales (Aberystwyth), and Liverpool.

Serious harm, according to representatives of the Council, is being caused to some foreign races by the circulation of suggestive films among peoples to whom Western customs and traditions are unknown. The Council does not consider it sufficient that only those films to which the term "obscene" could be applied should be banned, but would wish the ban also to be applied to other European films that can be classed as "unsuitable."

[4] See G. Schröder: On Specific Stimulation Therapy and Protective Inoculation in Tuberculosis, THE LANCET, Jan. 22nd, 1927.

A NEW DESIGN OF ULTRA-VIOLET LAMP.

THE "Trinity" ultra-violet lamp designed and produced by the Medical Supply Association, enables the user to employ the radiation either from a mercury vapour burner or two carbons, plain or cored, two tungsten rods or tungsten and carbon. The mercury arc and any of the open arc combinations can be used simultaneously, though not on the one patient. The apparatus consists of a floor standard of the usual type, with circular resistance unit round the foot of the central column, and carrying a counter-weighted arm provided at each end with one of the familiar spherical aluminium hoods. The arm has a good vertical travel and moves on ball bearings providing for horizontal movement. Locking arrangements are also provided. One hood contains a vacuum type mercury vapour burner consuming approximately three ampères. The arc is struck by tilting the metal hood which is so weighted as to return to the normal running position. This arrangement keeps the interior of the hood free from mechanism and facilitates the provision of a concave reflector, the angle of which can be adjusted to suit the position of the patient. This reflector is made of a special metal claimed to have an unusually high reflective power.

For local treatment, the whole lamp can be enclosed except for an aperture of the desired size, and ample ventilation appears to have been provided. The other hood is used to house the open arc, which consists of two adjustable electrode holders, each having an adapter to take either tungsten rods or carbons of about 13 mm. diameter. The handles are well insulated and striking is performed by pushing in one of the electrodes till the points touch; on releasing the pressure, the points separate a definite distance by the action of a return spring and the arc can then be adjusted. For local treatment, the front is rotated bringing into position a concentrating quartz lens. The consumption of this unit is approximately 5 ampères. Each unit is provided with its own resistance and switch.

The apparatus is primarily designed for use on direct current mains, but when alternative current only is available, an electrolytic rectifier can be provided. The design is ingenious and practical.

THE HYGIENE OF THE CHILD OF TEN.

IT would be useful as well as interesting to have a complete series of monographs on the various epochs in the life of man, woman, or child, considered from the standpoint of physiology, psychology, and hygiene. There are some excellent books somewhat of this kind such as Stanley Hall's "Adolescence" or Miss Drummond's "Round About Four Years, Old," but these authors were not medical and certain important aspects of their subject are passed over. Of works by medical writers there are a fair number dealing with infants, but for later ages there are few.

We have received a reprint of a thesis which Dr. Theodore C. Merrill, of Boston, U.S.A., recently presented at the University of Paris, dealing with the Hygiene of the Child of Ten. He remarks on the importance of this age—or rather of the period from 7 to 13 years; it is, he says, "à la veille de la puberté," and the latest period of childhood during which it is still possible to correct defects. Nevertheless, it has been neglected by hygienists. Dr. Merrill has been unfortunate in not having read the exhaustive study recently published in England, Dr. James Kerr's "Fundamentals of School Health." His subject, moreover, is so large that it could only be compassed by either limiting its scope to the features peculiar to this age or by dealing with it generally without going into detail. In the main, he has adopted the second course, and a good deal of his matter is of general application; for example, he includes a comparison of the climatic conditions of France and the U.S.A. which is well set forth and interesting in itself, but can hardly be said to concern peculiarly the child of 10. He gives also a lucid collection of statistics on height and weight with an account of the Pelidisi formula and some figures on the distribution of thyroid insufficiency and its treatment, which show how widespread the trouble is. He quotes from THE LANCET (1926, ii., 669) the statement of Dr. R. H. Vercoe that children of 10 are particularly liable to rheumatism. One of his sections is modestly called "Des banalités assez banales," but the critic would be wrong if he thought the precepts valueless. For example, if the importance of a regular action of the bowel in children were realised, much trouble and illness in later life would be avoided, and if the futility of having the hair singed and the small value of many special soaps were appreciated much time and money would be saved. Again, it is well known that "the pulse, respiration, and temperature are more readily modified in children than in adults by trifling causes and nervous influences," but if parents (and occasionally medical men) always kept this fact before them, they would be spared much needless anxiety.